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MARCH 1996

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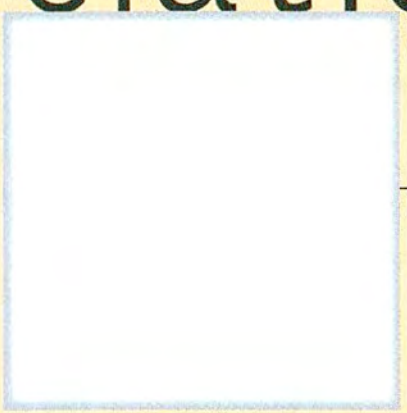


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1

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2

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What you need to focus on.

3

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90 ★★★★/7.4 Adobe Premiere 4.2
Video-editing software

92 ★★/3.7 Day-Timer Organizer 2.0
Personal information manager

When it comes to rating multimedia monitors,



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$1159*

MacUser *magazine recently put some of the leading multimedia monitors through their paces. They performed lab tests on image and sound quality. They stared at test documents, line art and scanned images. They played their favorite CD's at various levels. They fiddled with knobs and on-screen controls. And they researched street prices and warranties.*

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Rather than toot our own horn, perhaps we should refer you to MacUser *magazine:*

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+/OUTSTANDING •/ACCEPTABLE −/POOR

RATING	PRODUCT	PRICE	SUPPORT	IMAGE QUALITY	SOUND QUALITY
★★★★	**ViewSonic 17GA**	•	•	+	•
BEST BUY	A real multimedia bargain, the ViewSonic 17GA (estimated street price, $850) offers solid image quality, warm colors, fine-sounding audio, and a slew of easy-to-use on-sreen controls—all at a competitive price. The stylish case will also make you the envy of your office mates.				
★★★★	Apple Apple Vision 1710AV	−	•	+	+
★★★½	IBM 17S/S	−	•	•	+
★★★½	Nokia 447W	•	•	+	−
★★★½	Panasonic Pana Media 17	•	+	•	•
★★★	Philips 17B	•	•	•	−
★★½	Philips Brilliance 15A	•	•	•	−

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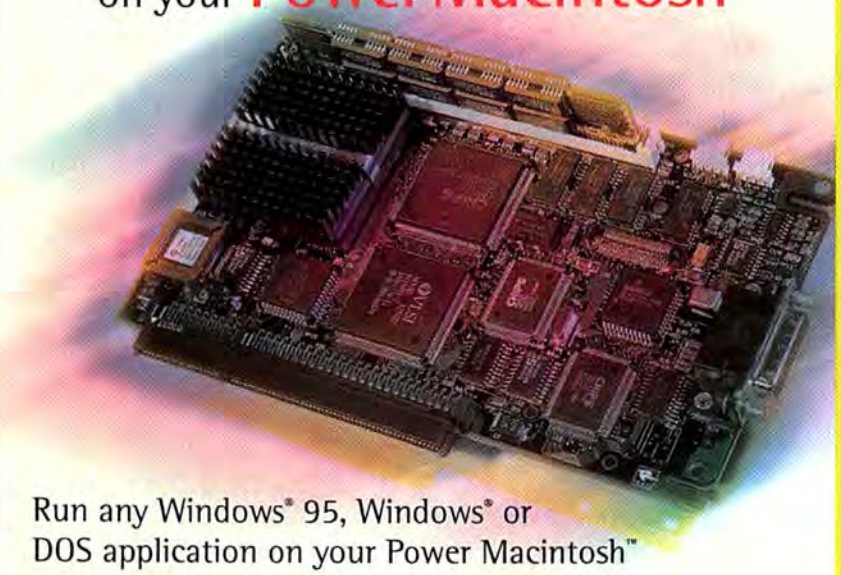


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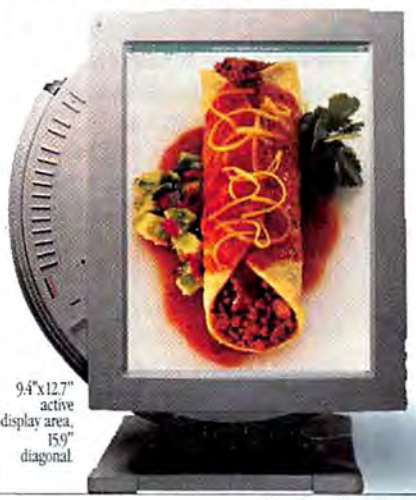
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Macworld

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Macworld Editorial

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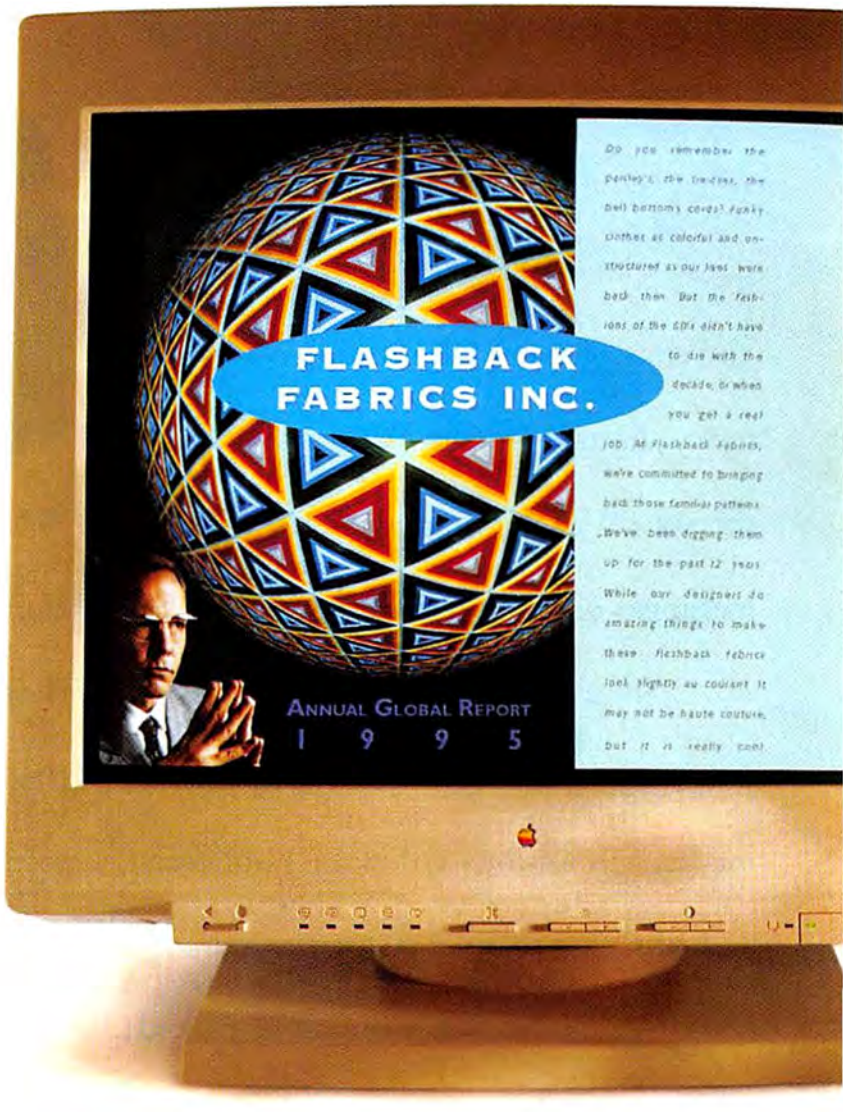


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Letters

Depends on Your Viewpoint

THANK YOU FOR THE EXCELLENT article on the back page of the December 1995 issue (*Viewpoint*). One question, though: what is the Electronic Frontier Foundation? How can I find out more about the EFF?

RAFFI MINASSIAN
via America Online

The Electronic Frontier Foundation is a nonprofit civil liberties organization working in the public interest to protect privacy, free expression, and access to online resources and information. For more information on the EFF, send E-mail to info@eff.org *or visit its Web site at* http://www.eff.org.*—Ed.*

I READ *MACWORLD* AND OTHER PUBLICATIONS to stay on top of the technical issues I face every day as a Macintosh desktop publishing manager. There are plenty of magazines I can read if I want to keep up with the political left wing's rantings about censorship, just like there are other places I can read about moral concerns that reflect my values. Mike Godwin's article is just not appropriate material for *Macworld*.

PHIL BROWN
via America Online

Ideology is in the eye of the beholder, of course, but when First Amendment issues intersect with technological developments, we regard them as falling within our purview as computer journalists.—Ed.

WHEN I OPENED MY DECEMBER *Macworld* I was delighted to see that Mike Godwin had the back page. I've been reading his articles in *Wired* and other forums for a couple of years now. No one else I know of covers the critical



GORDON STUDER

issues of the Internet—censorship, privacy, security—with such intelligence, wit, and clarity. More and more, being involved with computers means being involved in networks, especially the big one, the Internet. What will really matter ten years from now is not which hardware and operating systems we're using, but what we're allowed to do with them. I'd like to see *Macworld* address this aspect of computer culture more often, and I vote for giving Guy Kawasaki's old soapbox to Godwin.

ANTOINETTE LAFARGE
via the Internet

SuperMicro, Part II

I APPLAUD *MACWORLD* AND JOANNA Pearlstein for the article in the December 1995 issue (*Conspicuous Consumer*). However, I was horrified by *Macworld*'s decision to run SuperMicro's two-page advertisement in the very same issue in which you warn readers about their sales and service practices. I am well aware that *Macworld* is dependent on advertising dollars, I just hope it is not a slave to them.

JOHN KOSH, JR.
via the Internet

I WAS VERY INTERESTED IN THE COLumn regarding SuperMicro. I noticed an ad in the January issue of *MacUser* for Image Solutions that uses the same address and fax number associated with SuperMicro. Maybe the name says it all—they've got an "image" problem and this is their "solution."

JOHN CUTLER
Torrance, California

Macworld *takes the needs of its readers very seriously. Our president will not accept advertising from SuperMicro until the company can represent to the public that it has adopted procedures that fairly address the kinds of complaints and concerns our readers have been passing on to us.—Ed.*

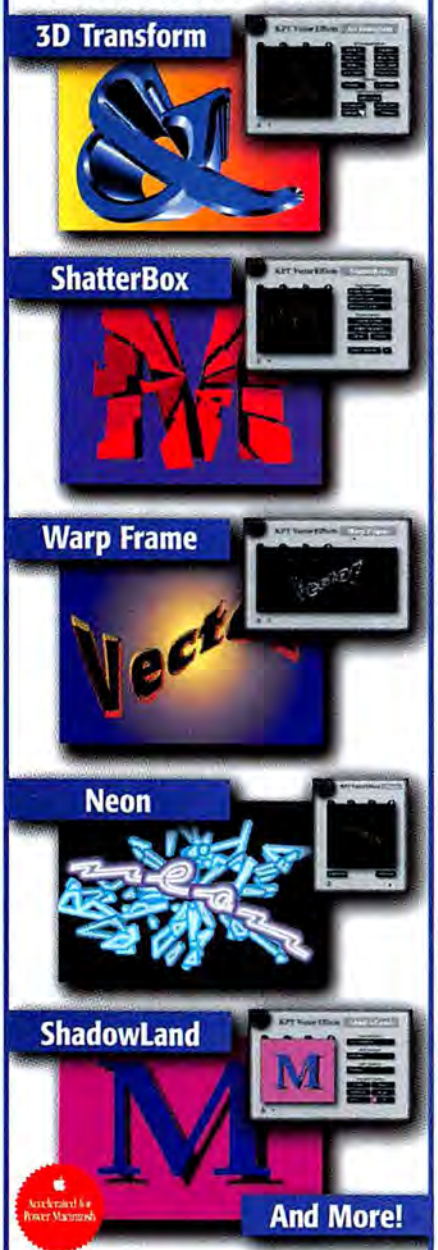
Are We Chintzy?

YOU GUYS AT *MACWORLD* ARE A LOT better than a certain other magazine when it comes to reviews. But what bothers me is your unwillingness to shell out that fifth star. I think an excellent candidate would be the 7500 (*Reviews*, December 1995). Your well-written, two-page spread on the new Power Mac touts the price/performance comparison, and even shows the 7500 to be cheaper than comparable Power Computing clones. If that wasn't enough, the reviewer himself decided to buy one. The only cons listed were software problems that have already

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CORRECTIONS

- *ClarisWorks does not support picture fields in its database ("Works versus Works," November 1995).*
- *MacPPP has been renamed FreePPP* (Networks *news, December 1995).*
- *Power Computing's Power 100 was left out of the home and small-office systems benchmark ("The Best Mac for the Job," February 1996). The Power 100's Overall Score was 3.3; CPU-Intensive, 3.1; FPU-Intensive, 4.9; Disk-Intensive, 1.8.*
- *In "The Best Mac for the Job," February 1996, we advised scientists and engineers whose fieldwork takes them on the road, to consider a PowerBook; the model should have been the 5300cs.*
- *The PowerWave 604–series benchmark* (Reviews, *February 1996) incorrectly names two drive mechanisms: they should be the Seagate ST32930N and the IBM DPES-31080.*

been fixed. All around, the 7500 is a robust machine, and deserved the fifth star.

ALEX JOHNSON
via America Online

True, the software problems listed as cons in our review have been fixed, but Macworld *doesn't award its coveted fifth star on the* hope *that problems will go away. We leave it to readers to decide if Apple has sufficiently solved the software problems to warrant that fifth star.—Ed.*

DOS Cards Rule

ABOUT THE LETTER ASKING WHY anyone would want a DOS card in their Mac when they can buy a separate PC for less money (*Letters,* December 1995), I have three reasons: (1) If you want to share files between the two platforms, it's a whole lot easier to have everything on one drive than it is to network and share files. Since you have only one set of files, keeping everything in sync is not a problem. (2) Have you ever tried to back up a PC? On the Mac, you run Retrospect and you're done. On a PC, even if you can get the backup to work, try restoring. Assume the worst case, that you need to restore everything. On the PC you'd first have to install DOS just to boot, then install Windows, then install the backup software, then restore everything, and pray that it all works. With the Mac, you boot off a CD or floppy, install a minimum system, install Retrospect, and restore the world. (3) With a DOS card, you can create multiple C: drive files, enabling you to run any Windows flavor you want. Try that with a PC.

I currently run a Quadra 800 and a Pentium-based PC. I can't wait until a PCI-based DOS card comes out so that I can go out and buy an 8500 and the DOS card, and get rid of the PC.

FAROKH IRANI
via the Internet

Parameter-Be-Gone

JIM HEID COVERED THE TOPIC OF "Clearing Hard Drive Clutter" pretty well, including those never-looked-at printer drivers (*Working Smart,* December 1995). One thing he overlooked is the hundreds (literally) of modem parameter files that get installed with America Online and other communications software. Especially on a large drive (at 16K apiece), it adds up pretty quickly. Unless you've got more than one modem, you need only one parameter file.

ALLEN CLARK
via the Internet

The Empire Speaks Back

THE IRATE GLENN HOLLAND IS UNfair to blame America for the units he claims to despise—most of these are of British origin (*Letters,* December 1995). Some of us retain a bizarre pride in what we still call Imperial units—remember the Empire, Glenn?—and would not object to being paid in groats every fortnight. Anyway, how many units does New Zealand need, besides the "flock"?

CLIVE ROBERTS
via America Online

More Fax Modem Facts

AFTER HAVING RECENTLY READ YOUR review of 28.8-Kbps modems, I was rather bothered to see how poor technical support was for many of the modem manufacturers ("Fast Fax Modems," December 1995). Triggered by your article, I

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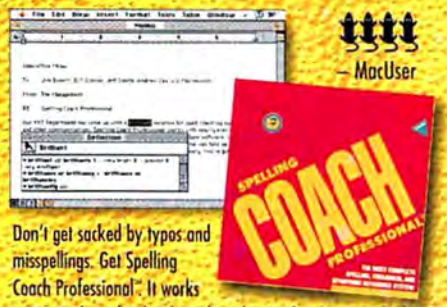
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decided to contact Supra to determine what was involved in getting a new firmware revision for my aging 14.4-Kbps SupraFaxModem. Except, instead of waiting forever on hold as I do with just about every company these days, I resorted to sending E-mail to Supra's advertised technical-support address. Within 24 hours, I received a response saying that a new version of the firmware would be mailed to me immediately. While my request was rather simple, I couldn't have anticipated a quicker and more helpful response. In general, I've found E-mail technical support to be more helpful than phone support in just about all cases. Of course this doesn't help the very newest users, but otherwise, I urge those users with E-mail capability to choose E-mail technical support first.

STEVE ROSEN
via the Internet

YOUR REVIEW OF 28.8 FAX MODEMS missed one key subject—the fax software provided with each modem. In order to fax, you need special fax software, and the fax software bundled with most modems is confusing, messy, and difficult to use. Sometimes it's a crippled version designed to sell you an upgrade to the "full" program. I find that Global Village's bundled fax software is so far superior to any other contender that it tips the scales toward choosing a Global Village modem if a user will be doing much faxing.

DAVID LERNER
via the Internet

THANK YOU FOR A VERY INTERESTING and informative feature. However, as an owner and extremely satisfied user of a SupraFaxModem 288, I must object to your statement that "the Quicktel and Global Village modems are the only ones that include ARA (Apple Remote Access) scripts." My modem (which I purchased from MacConnection almost a year ago) shipped complete with an ARA script that I find invaluable in my almost daily connections to my business network.

I'm sending this via my SupraFaxModem 288 and Apple Remote Access!

PAUL THOMAS
via the Internet

I COULD NOT AGREE MORE WITH YOUR assessment of the U.S. Robotics Sportster 28.8 modem in your December issue. I have owned the product for eight months and, generally speaking, have been pleased with its performance. Your assessment of U.S. Robotics' product support was, unfortunately, on the mark as well. I have tried on a number of occasions to get questions answered by a living and breathing human being to no avail. In addition, E-mail queries—which are nearly mandated, not suggested—are answered not individually, but with canned responses based on the category of your particular problem. As much as I have liked the modem, I cannot recommend the company to a friend, nor can I see myself buying another U.S. Robotics product.

JIM VOGL
via America Online

THANK YOU FOR YOUR EXCELLENT coverage on fast fax modems. I read the entire article but saw no mention of the Apple GeoPort Adapter. So I read the whole article again and met with the same result. Now, I know—why would you mention a 14.4 modem in an article about modems running at 28.8?

As a first acceptor of new technology, I purchased a Power Macintosh and GeoPort Adapter with the impression that this was the future of modem technology and would be easily upgraded to 28.8 with a simple software upgrade. Over a year and a half later, I am still running at 14.4 and have heard of no plans to upgrade the GeoPort to 28.8. Yes, I am aware of the other capabilities of the GeoPort, but Internet access and speed are still my primary concerns. Can you provide any insight?

SAM DENSLER
via the Internet

Apple hasn't said that it is not going to ship a faster version of the GeoPort, but it hasn't said when it will, either. Possibly there will be some GeoPort products from third-party vendors, but not before mid-1996.—Ed. ■

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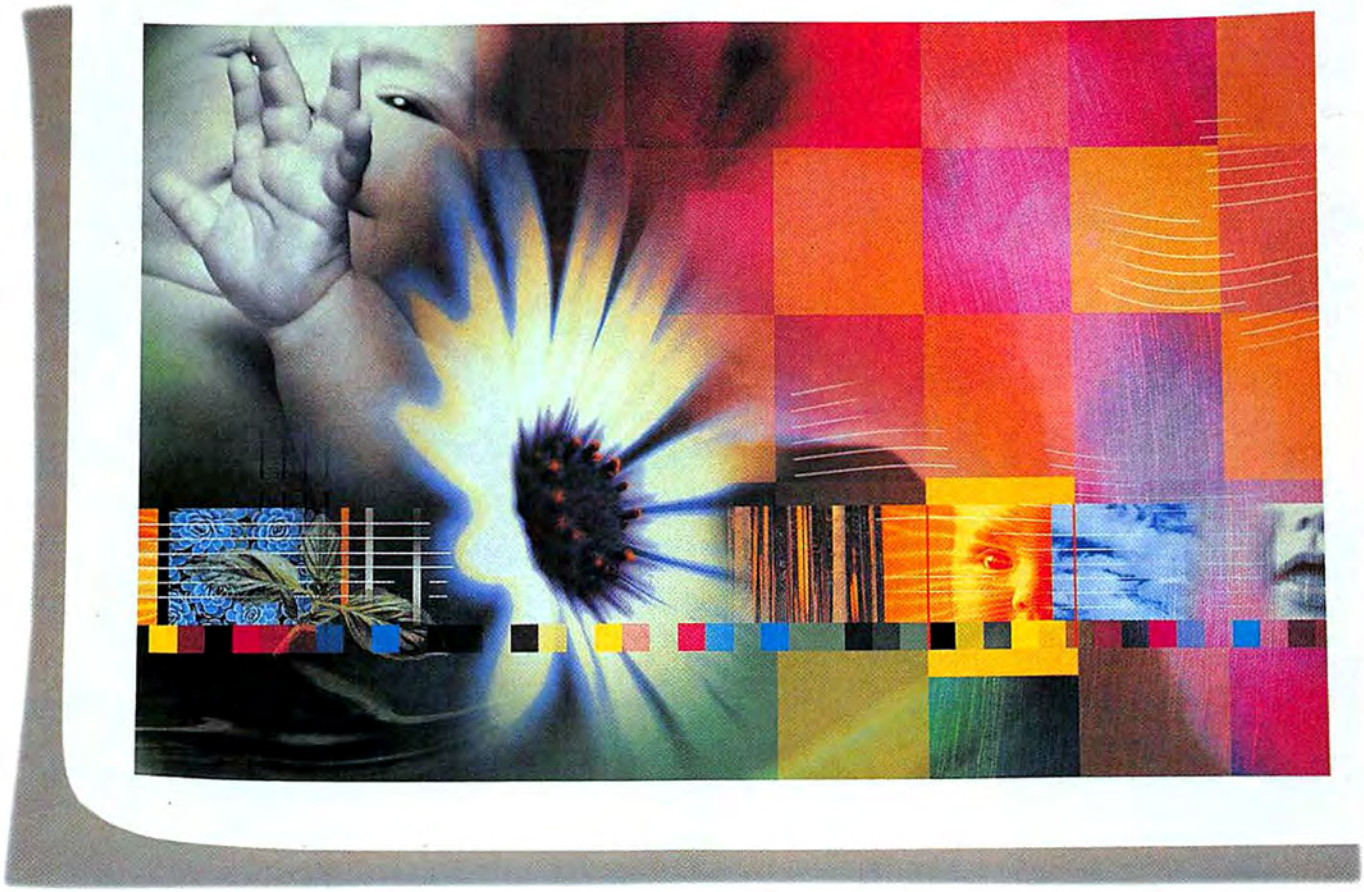
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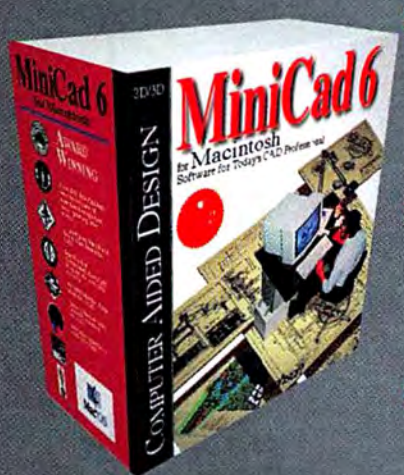


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Circle 46 on reader service card

by Adrian Mello

Will Internet Kill the Computer?

DUMB TERMINALS ARE BACK IN VOGUE

TECHNOPHILES ENJOY A strange relationship with personal computers. Given the pace of technological change, we must keep asking, "What new feat, what higher power, will grace our desktops?" We shun so-called obsolete technologies with such fervor that it seems we're trying to kill off our computers before they drag us into the tar pits of technological extinction. Nothing characterizes this manic ambivalence better than the anticipation with which we await subcomputers.

Subcomputers (my term) are a new variety of computers aimed at people who don't need the broad capabilities of personal computers but who nevertheless want access to specific functions that require some sort of underlying computer hardware. Ironically, this is how many saw the Mac when Steve Jobs first introduced it. Jobs held up telephones and toasters as paragons of virtue, proposing to model computers after appliances. Without confronting you with a barrage of complexity, he argued, appliances simply get the job done.

Subcomputers—Real and Imagined

Subcomputers exist. Everyday examples include handheld calculators, Nintendo entertainment systems, alphanumeric pagers, and the Newton.

The kernel of each new idea about subcomputers contains a flash of brilliance. We technophiles in particular are drawn to that flash, recognizing in it some new and interesting type of computing activity. Sometimes, however, we're led down the garden path by proponents of a new technology who wildly overstate its growth potential. Remember when the Newton was first introduced? John Sculley predicted that the market for PDAs would soon reach $1,000,000,000,000 (that's one trillion dollars).

The NC—Consumer Boon or Return of the Dumb Terminal?

The latest idea comes from Oracle CEO Larry Ellison, who dubs it the network computer, or NC. Ellison proposes that you could effectively replace most computers with a $500 box that provides basic network services and Internet access. Oracle plans to make a prototype of the NC with a low-cost RISC processor and 4MB of RAM, along with a keyboard, mouse, or other input device, in the first quarter of 1996. The prototype will also include video output and will support networking architectures such as Ethernet and ISDN. Andy Laursen, vice president of network computing at Oracle, said the NC will probably include a small, low-quality monitor but no hard drive.



This concept has drawn a lot of attention over the last couple of months, with many critics calling it little more than a return to dumb terminals. Dumb terminals are to personal computers what dinosaurs are to mammals. Indeed, it is hard to imagine what could be compelling about a hobbled, albeit less expensive, computing device.

It's Not the Hardware

If a $500 box were all there is to an NC, I would agree that this is a foolish idea, but there's more here than meets the eye. The funny part is that the NC's potential doesn't really have much to do with its price or its hardware.

NCs are not a regression to a monolithic, centralized model of computing, but rather a transformation to a distributed model of computing. By offloading software, storage, and maintenance requirements to sources on the Internet or other networks, NCs reduce demands on users.

This new distributed-computing model has become plausible with the growth of the Internet. Users share information based on simple document and network protocol standards like HTML and TCP/IP. Java, a new computer language from Sun Microsystems, expands this cross-platform strategy by letting users download from the Net applications that run on virtually any computer. Java's full potential is hard to predict. Still only in beta, the first downloadable Java applets are client-server applications, facilitating communications.

If Net-based software distribution fulfills its visionaries' dreams, instead of starting up a program from your hard disk, you would just log on to the Net and begin to work. As you work, the necessary software would be sent temporarily from the Net to your NC.

Even more important, the NC idea points to a change in the way we think about how computers are useful. Aside from the question of whether you need a PC or an NC, we seem to be valuing computing for its communications ability rather than its data processing ability. The growth of the Internet shows us that there

continues

HANK OSUNA

may be a greater demand for shared data communications than there is for isolated data processing.

Whither the Mac?

Where does the Mac fit into this universe? The Mac will be able to take advantage of distributed computing over the Internet just like the PC or NC. What will matter are integration and ease of use, Apple's fortes. In addition, the simplicity and openness of Internet standards offer Apple and smaller companies who develop distributed-computing applications the opportunity to compete with Microsoft's huge installed base.

Apple could also prosper by providing key software technologies—another of Apple's strong suits. The first technologies should be OpenDoc and parts collections like Cyberdog. OpenDoc could fill a missing piece of the distributed-computing world by providing a way to share data and operations among standardized applets. It could serve as the glue for the disparate pieces that, along with scripting and other tools, would let users and developers provide a coherent organization to their computing activities.

Will Apple Lead?

But there's a problem: Apple would have to be aggressive. To succeed, Apple would have to publicize and disseminate OpenDoc as freely and completely as Sun is doing with Java (and as Netscape did originally with its browser). Apple needs to evangelize developers to create products that showcase OpenDoc's ability to support the distributed-computing model. OpenDoc will only mean something to users if there are real-world examples—in this case, OpenDoc parts. Cyberdog could play the key role by demonstrating what OpenDoc can do.

Although Mac Internet clients have an extremely strong presence, key vendors have not always provided Mac client versions. When companies like Netscape fail to deliver a Mac client when they ship their Windows versions, for example—Apple needs to be ready with its own software. Macromedia's Shockwave (development tools that let Macromedia Director files run on the Internet), Sun's Java, and other new multimedia technologies need to be available for the Mac at the same time as they are for Windows, or Apple will lose its edge as an Internet player.

Not Yet the Last Word

In the new world of the Internet, arguments about competing hardware platforms miss the point. Similarly, pitting subcomputers against personal computers is shortsighted. The winner will be the one that offers the most useful software technologies. This is where Apple shines.

The Mac presence on the Internet is remarkably strong. If Apple develops a business and technology strategy that takes full advantage of the Internet's transformation of personal computing, it will remain so. So far, Apple has been loath to do this and has missed opportunities. Rather than leading the charge on to the Internet, Apple has focused on improving its ability to meet demand and achieve a stronger financial performance. This is dangerous. The Mac must evolve with emerging technologies and emphasize communication over isolated processing. Ultimately, it's a choice between progress and obsolescence. m



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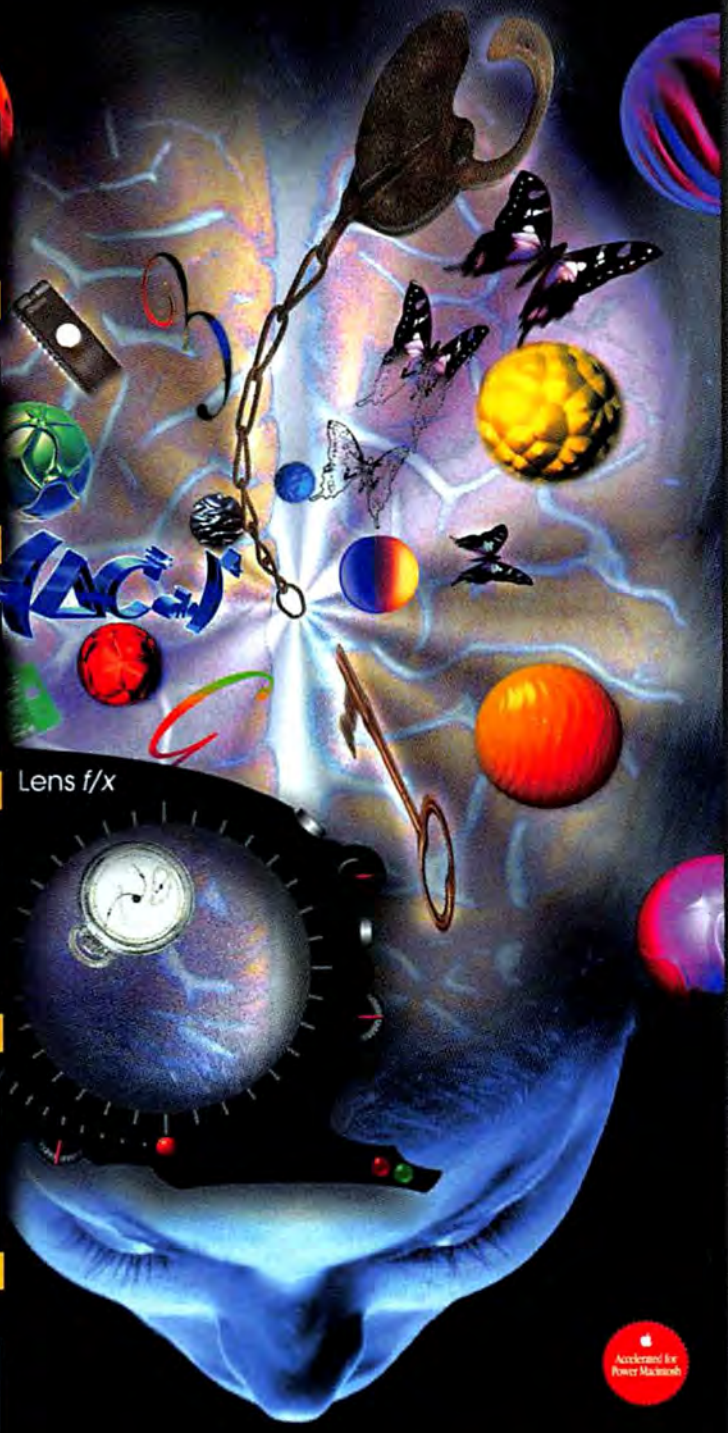
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Circle 95 on reader service card

by David Pogue

Confessions of a Macintosh Therapist

NOBODY KNOWS THE TROUBLES I'VE SEEN

I AM A MACINTOSH THERAPIST. I don't mean that my clients are Macs, although that's a fascinating concept. ("Doc, you gotta help me! I have bad F-line instructions every night, I'll be discontinued in 18 months, and people say my market share is too small.")

No, my job is to soothe and reassure the *owners* of those computers. My clients probably don't see it that way; they probably think they're hiring a consultant, a tutor, an expert to demystify the frightening world of 32-bit bus architectures and virtual memory. But the Mac is the easiest-to-use computer on the planet. Deep down, I believe that most of my clients really just need somebody to talk to.

In ten years of being a Mac shrink, I've seen monitors installed upside down, mice used backwards, and power strips plugged into themselves. Almost every time, though, I wind up being educated almost as much as the client.

The Old Guard

One of my favorite clients is a 60-something writer we'll call Gary*. He had never even used an electric typewriter, let alone a computer. For the first week of his initiation into Macintosh, my primary task was to prevent him from smashing the Mac's keys into smithereens.

After teaching him the basics, I left him alone with his Mac. Everything seemed OK until he called the following Sunday night.

"I'm about to throw this damn thing out the window!" his voice exploded into the phone. "All I want to do is type up a stupid grocery list, but nothing happens when I type, and I keep getting these untitled folders, and I can't throw them away—my screen is filled with them. I'm gonna return this thing—it's a lemon!"

It didn't take me long to figure out what was happening. Gary had been trying to create a new untitled document in the Finder—by choosing New Folder from the File menu, of course.

Over the phone, I walked him through the procedure for dragging a folder to the Trash. But time and again, Gary insisted that his forest of folders wouldn't go away. He swore that he was dragging directly onto the Trash; he swore that the folders wouldn't go in; mainly, though, he just swore.

After 20 minutes of this, I realized I'd have to pay him a house call. When I arrived, one look at his screen explained why I hadn't been able to help over the phone: instead of dragging the icons to the Trash Can, he had been dragging the *open windows*, by their title bars, to the Trash. In the lower-right corner of his screen were 35 windows, all mashed and overlapped in a heap.



But you know what? Come to think of it, why *shouldn't* you be able to drag a window exactly as you can an icon? In my best Mac-therapist voice, I told Gary this mishap wasn't really his fault—it was really a glitch in the Macintosh interface.

Maggie's Menus

Maggie is a middle-aged woman with ten children, a new PowerBook (her first computer), and a book contract. I installed Microsoft Word 5, sat her down, and began to show her the ropes.

But when she saw the menus, she freaked. "What *are* all those things?!" she exclaimed. "That's way too many options. Can't you get rid of them?"

The funny thing was, this was Word; using the ⌘-option–hyphen keystroke, I actually *could* delete menu commands. Under Maggie's watchful eye, I took out Table of Contents, Index, and all the page-layout commands. Now she had a clean, basic word processor.

I sat back, smiling—but Maggie wasn't done yet. "What about that thing?" she asked, pointing to the Tools menu. I explained the value of the Spelling, Grammar, and Thesaurus commands.

"If I didn't know how to spell or write, I wouldn't have a book contract," she said.

I took out the Tools menu.

Before long, we were in a frenzy of menu shortening. She even had me take out the font and size menu items. "It's a *book*," she said. "What book uses more than one typeface?" Hey—she had a point. Out they went.

When we finished purging the commands Maggie considered extraneous, there were only three commands left: Bold, Save, and Quit.

Anyway, Maggie's was a win-win situation. She went away happy with her ideal word processor; I went away happy she hadn't bought Word 6.

Judy's Printouts

Those panicked late-night calls are always the most fun. Like when Judy called from

continues

*Because that's his name.

Florida, shouting as though the telephone hadn't yet been invented.

She claimed that her Macintosh had developed a demon mind of its own: every time she switched it on, the printer began spewing pages uncontrollably. She'd unplug the Mac, wait a few minutes ("to let it get its head together," as she put it), then turn it on again—and once again, the printer would begin churning.

"Well, what's it printing?" I asked her.

"Well, let's see." (Paper rustling.) "Oh, this! I was working on this *months* ago. Before we moved to Florida, even!"

I popped the $64,000 question: "Listen. Judy. Have you actually used the computer since that time?"

When she said no, a theory dawned. Suppose that, months ago, she'd typed up a 40-page manuscript and tried to print. Suppose PrintMonitor had taken a moment, as it's designed to do, to process the document before starting to print—but Judy, impatient, chose the Print command again . . . and again, and again. Finally, when no pages had emerged from the printer after 30 seconds, she got disgusted and turned off the Mac. PrintMonitor, however, the stoic soldier, silently vowed to complete its task whenever it was next given the opportunity.

Cut to her new Florida home, months later. She turns on the Mac; PrintMonitor springs into action; it attempts to print those multiple copies of the manuscript.

Once again, the breakdown wasn't wholly a human one; if the Mac's system software were only a little smarter, it would have *asked* if Judy wanted the months-old printout. From that day on, whenever I've set up a beginner's Mac, I've left Background Printing off.

Tom's Typing

Tom called me up in a breathless froth, claiming that his last five hours of typing had "just disappeared, oh God, all those stories about people losing all their work on the computer, and now it's happened, it was all there, 15 pages, I even remembered to save, but then I took a phone call and boom, it's gone, just gone, my screen's completely white!"

I told him not to move a muscle until I could get over there in a cab. When I arrived, sure enough, his word processor window was completely empty. I scrolled upward—more whiteness—and scrolled, and scrolled. Nothing.

When I dragged his scroll-bar box all the way to the top of the document, however, his text reappeared, much to Tom's sobbing relief. His document contained 15 pages of text, all right—and 97 pages of *returns*. While he had been on the phone, the open portion of a Manhattan white pages had been resting on Tom's enter key. From the Mac's point of view, Tom hadn't spent 20 minutes on a phone call—he'd spent 20 minutes pressing enter, over and over again.

That's why these days, I also turn off the Keyboard Repeat feature for new Macintosh users.

Reverse Psychology

I was recently invited to speak to a group of fifth graders at a school in Charleston, South Carolina. These kids were part of a special pilot program in which every student was issued a PowerBook for the year. (Man, why couldn't I have gone to a school like that?)

Anyway, I thought this would be fun. I'd show the youngsters a few tricks 'n' tips . . . you know, throw them a few pearls

continues

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of my superior Mac knowledge. The teacher introduced me to her 15 PowerBook-clutching students.

"Hello, children," I began, smiling. "Are we ready to have some fun with our computers?"

Respectful silence.

"Hey, I know," I went on brightly. "Let's record some funny sounds. Do you know how to do that?"

Fifteen 11-year-olds, nodding slowly.

OK, so they knew that one. "All right, why don't we replace our boring gray desktops with a fun, crazy pattern? Wanna try that?"

Fifteen 11-year-olds, shaking their heads no.

The teacher, bless her heart, intervened. "Ah, look, Timmy, why don't you show Mr. Pogue what you've been doing on your PowerBook lately?"

Timmy showed me his PowerBook, all right—I barely recognized it. He'd used ResEdit to change his Trash Can into a Ninja Turtle. A 640-by-480-pixel *Star Trek: Voyager* PICT file filled his desktop. He had changed the Finder menus from File, Edit, View, and Special to Puke, Belch, Barf, and Booger.

Timmy double-clicked on something. "My media-center project," he mumbled.

It was an interactive Macromedia Director fly-through of the school's library, complete with thudding music track and QuickTime movies. My jaw fell open. These kids were an Apple commercial come to life.

"Thank you, Timmy," said their teacher. "Class, are there any questions you'd like to ask Mr. Pogue?"

A hand went up. A little girl in the back. I called on her.

"Um . . . we've been having some, like, node dropouts in our 10BaseT Ethernet routers, you know?" she asked (well, that's what it sounded like to *me*). "Do you think it might have something to do with our new multiline remote-access server?"

Suddenly I wished I had the number of a good Mac therapist.

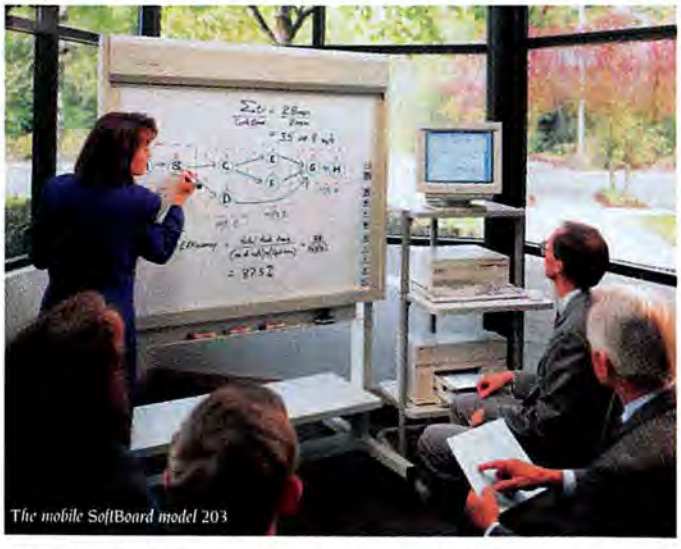
The Upshot

Of course, I'm only mentioning the memorable disasters. Far more numerous are the success stories, when my clients' faces absolutely light up on seeing how much fun the Macintosh is; or when they become happily addicted to America Online; or when, two months later, they invite me to visit their own *Web pages.*

Furthermore, a year from now, Apple's system software will present even fewer snags for the first-time Macintosh user. If the plans for System 8 (Copland) are fulfilled, people like Gary *will* be able to drag a window to the Trash. The redesigned Open File and Save File dialog boxes will reduce what little confusion still remains about the Mac interface. And the multiuser feature, like today's At Ease, will let you reveal layers of interface complexity only when you want them.

Maybe, in fact, Copland will put Mac shrinks like me out of work. I'll have to find a different field—one where the patients are plentiful, desperate, and seeking long-term treatment. Hey, I know: Windows therapy. **m**

Contributing editor DAVID POGUE is the author of *Mac FAQs [Frequently Asked Questions]* (IDG Books Worldwide, 1995), in which he answers the 500 most-often-asked questions his clients pose.


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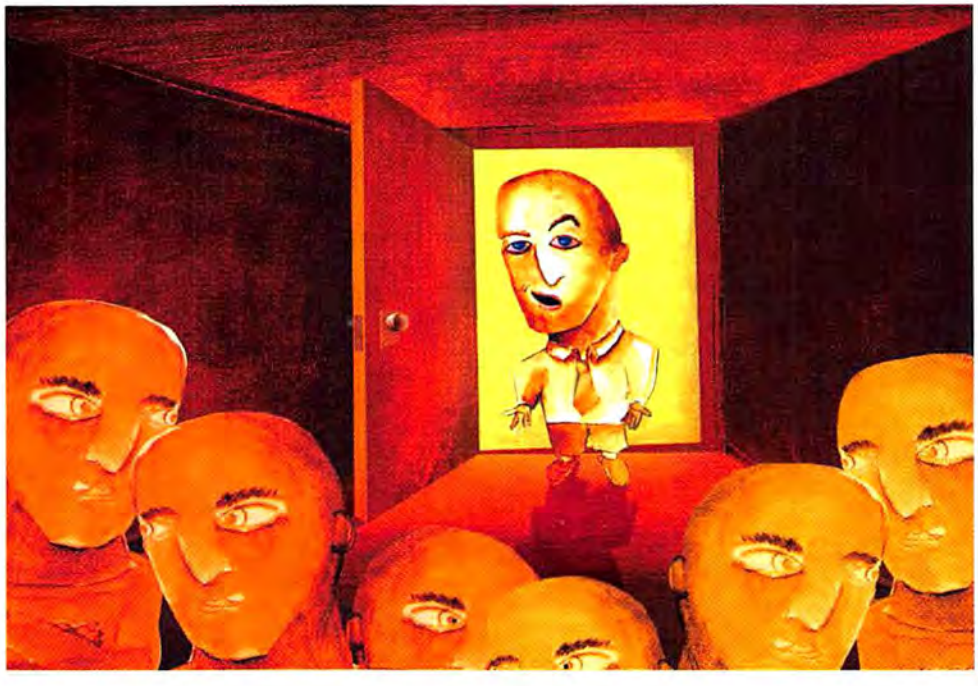
News

industry

OpenDoc: Now the Hard Part

THE KEY TEST IS WHETHER DEVELOPERS WILL USE IT

by Cameron Crotty



JOHN KITTER

Under heavy fire for not single-handedly revolutionizing the software industry again, Apple Computer has released the final OpenDoc software-development kit (SDK) for the Mac OS and announced that 300 software developers plan to ship OpenDoc products in 1996. But that number may be unrealistic, as very few developers so far have concrete plans for delivering OpenDoc products.

While developers can't be blamed for not using unfinished tools to develop products, the noticeable shortage of OpenDoc products solidly planned for the near future has left some industry analysts wondering whether OpenDoc is dead on arrival. With Microsoft's competing OLE technology in wide use on PCs, and Novell's recent decision to drop development of OpenDoc for Windows (IBM has picked up this task), developers and users alike have to ask whether OpenDoc's time went before the SDK came.

OpenDoc promises to transform software development by letting companies create small, efficient programs dedicated to specific tasks—such as spelling checks or RGB-to-CMYK conversion. OpenDoc parts or components can work with each other or as plug-ins to larger programs, but with a twist: they don't need to be written for specific programs, as do traditional plug-ins. Instead, any OpenDoc document can benefit from any available OpenDoc part.

Assembling the Choir

Apple's list of OpenDoc supporters contains a few familiar names, but is noticeably light on Macintosh developers with extended track records.

Gina Clark, OpenDoc product manager for Apple, says her group has been focusing on smaller developers, with shorter development cycles and without entrenched products, as more willing to embrace new technologies. "We expected to get dinged for that," she acknowledges, "but the delivery cycles of larger developers are so long that the best we can hope for is that they start development in 1996 and deliver in 1997." Scott Hebner, OpenDoc market development manager for

IBM, agrees, anticipating that OpenDoc will be adopted first by "in-house and corporate developers," and "smaller to medium-size [software developers] trying to compete in a saturated marketplace."

Fair enough, but this just confirms that users shouldn't expect a mainstream OpenDoc software explosion this year. Some developers do have firm product plans (see the table, "OpenDoc Promises"), but most express doubt. Afraid of being burned supporting another Apple technology du jour, they're uncertain where to fit OpenDoc into their products (and how to sell them), and they're doubtful about customer demand for component software.

Technology du Jour? When asked about OpenDoc, nearly every Mac developer brings up at least one high-concept Apple project that flopped as reason enough to be wary. "I'd love to use QuickDraw GX," a much-hyped but little-used System 7 component, says David Feldman, vice president of products at Specular International, a graphics-software developer, "but the reaction from our customers was, 'Don't you dare make me install GX.'"

Hesitant to assault Apple publicly, nearly all bemoan dollars spent on abortive technologies like Publish and Subscribe, or express relief at having decided to not buy into the latest Apple technofad.

Other developers are having trouble figuring out what technological or marketing benefits they will derive from adopting OpenDoc. Dave Kleinberg, vice president of utility developer Rae Technology, says, "They have a clock spinning and an airplane flying across their demo, and they say that's really great. But we don't see how it applies to us."

The Chickens and the Egg One business-software maker

continues on page 42

storage

Battle Looms over PC Cards

TWO GROUPS DELIVER INCOMPATIBLE STANDARDS FOR HALF-SIZE CARDS

by Howard Baldwin

Users of digital cameras and PDAs will face yet another set of competing standards with the introduction of half-size PC Cards for storing and transferring digital files. Both formats use flash memory chips rather than magnetic media to hold data.

Apple is part of the CompactFlash Association, the first group to announce a standard for these cards based on technology from SanDisk (formerly SunDisk). A company representative says Apple is interested in the CompactFlash (CF) standard for its QuickTime cameras, not for the Newton PDA, which uses a different storage interface than the CF cards use.

Other members of the group include Canon, Kodak, Hewlett-Packard, Polaroid, Seagate, and Seiko. Measuring 1.7 by 1.4 by 0.13 inches, CF cards can be used in a traditional PC Card slot with an adapter. The only device currently using the half-size CF standard is the IBM Palm Top PC110, a computer available only in Japan.



GIBSON

New flash-memory storage for digital cameras and PDAs is coming from both SanDisk and Intel.

SanDisk started shipping the half-size cards to resellers with 2MB, 4MB, 10MB, and 15MB capacities in October. Estimated retail prices range from $135 for a 2MB card to $540 for a 15MB card.

A competing half-size form factor—1.5 by 1.3 by 0.13 inches—is under development by a consortium made up of Intel, Advanced Micro Devices, Fujitsu, and Sharp. According to Intel, the MiniCard will ship this spring with capacities of 2MB and 4MB at an estimated retail cost of $80 and $130, respectively. SanDisk's CF cards cost more because they use hardware interfaces where Intel MiniCards use software; SanDisk claims its method provides better compatibility.

systems

PowerPC Card Ships for PowerBooks

BUT THEY WON'T RUN THE COPLAND OS

by Cary Lu

You bought a PowerBook 500-series notebook because Apple promised you could later upgrade it to PowerPC. That moment has arrived: at press time, Apple (408/996-1010) planned to ship the upgrade card by January 1996 at an estimated price of $699. A replacement CPU daughterboard with a 100MHz 603e PowerPC, it has 8MB of RAM on board but no external cache (which would speed operations by 5 to 10 percent). Early tests show that an upgraded 500-series PowerBook runs within 10 percent of a 100MHz 603e-based 5300-series for common operations.

A Choice of Upgrades But by spring, you'll probably have some additional options. Newer Technologies (316/685-4904) will offer several PowerPC upgrades—with an Apple ROM. Three of them will be faster than Apple's and are likely to include an external cache. The first will have a 117MHz CPU; next will come cards with 135MHz and 150MHz CPUs. To make space for the cache, though, Newer may have to eliminate some or all of the RAM on its daughterboard, leaving the RAM upgrade to a standard 500-series RAM card (which should be compatible with all the Power Mac upgrades).



DOUG ROSS

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However, you may want to trade up to a larger-capacity RAM card, especially for a daughterboard lacking RAM.

Copland Not Supported

But will an upgraded 500-series PowerBook run Copland, Apple's forthcoming Power Mac–only operating system? Unlike Apple's and DayStar Digital's PowerPC accelerator cards for desktop Macs, the replacement daughterboard includes a true PowerPC ROM. But since the motherboard's input and output circuits are still based on a 68040 design, Apple's PowerBook product managers say that Copland *won't* run on upgraded 500-series PowerBooks.

It's a different story for Apple's $1299 Duo 200-series PowerPC upgrade. This upgrade replaces the Duo's motherboard, so you end up with a true Power Macintosh that will run Copland without difficulty.

systems

Low-Cost Mac Clone Offers PCI and NuBus

POWER COMPUTING'S NEW POWERCURVE SERIES

by Charles Piller

Power Computing (512/246-7807, *info@power-cc.com*) is targeting its latest line of Macs—which it plans to introduce at Macworld Expo in January—at the home, SOHO, and education markets. Available in either the standard size or the low-profile "pizza box" design, the PowerCurve 601/120 sports a 120MHz PowerPC 601 processor on an upgradable daughtercard.



SUZANNE KOADY

The standard-size PowerCurve offers PCI and NuBus options.

Featuring 8MB of RAM (upgradable to 256MB) and a 256K cache card (upgradable to 1MB), the new models will offer a range of hard drive options from 850MB to 4GB.

Like the PowerWave series announced late last year, the PowerCurve will offer built-in Ethernet and support for the company's StarGate riser card; the low-profile box provides one NuBus and one PCI expansion slot, while the standard-size version comes with either two NuBus and two PCI slots, or three PCI slots and no StarGate card.

The PowerCurve includes a range of productivity software and CD-ROM titles, although the CD-ROM drive is optional. The base model costs $1849 for a tower unit and $1899 for a desktop unit.

PowerCurve buyers can also get Microsoft Office installed for a fee undetermined at press time.

Mac Married with Phone

PAGER, CENTREX, AND MORE IN ONE BOX

For years, computers have had little to do with the voice side of telephones. Now, Big Island (408/342-8300, *info@big-island.com*), a newly formed company made up of people from Global Village, SuperMac, and Apple, is trying to change that. The company's first product, YoYo, is a hardware-and-software combination that connects via the ADB port and lets you use your Mac to manage a variety of voice telephony functions.

For users who subscribe to Caller ID (available in 46 states so far), YoYo detects and displays a caller's phone number on screen; those who have extended service can get the white-pages listing associated with the calling number. YoYo can also send an AppleScript message to a PIM to display your own information about the caller.

Other identification options assign distinctive Mac sounds to specific callers (chimes of doom for the boss?) or have the Mac speak the caller's name. You can direct YoYo to block up to 400 specified phone numbers, either permanently or at scheduled times. YoYo can also dial calls from a Mac phone list and manage Centrex features—such as call transfer, conferencing, and forwarding—from the Mac screen. For sending short messages to pagers, YoYo includes a 1200-bps modem, which outpaces a higher-speed modem because of the shorter call-setup time.

In its first version, YoYo will be limited to a single phone line and won't deal with fax or data. Due in March, YoYo will retail for $149.—CARY LU

NEWS FLASH

Radius Ends Its Clone Era

UMAX BUYS LICENSE AND PLANS NEW MAC LINES FOR HIGH AND LOW ENDS

by Cary Lu

At Macworld Expo in January, Umax Data Systems announced a deal to acquire Radius's clone business. The agreement transfers the Radius Mac OS license and system designs to Umax Computer, a new division of Umax Data Systems. The entire Radius clone-engineering team has joined the new venture. Radius will retain a 20 percent stake in the new company, which will sell PCI-based Mac clones. Umax clones will use the SuperMac brand owned by Radius, also transferred with the sale. Umax, which recently obtained a more limited Mac OS license from Apple, will fold its earlier plans for Mac clones into the new company.

Umax Computer's first offering will be a multiprocessor-capable workstation based on the 150MHz PowerPC 604 CPU, aimed at graphic designers and due out in April. Umax officials expect the highly expandable machine to use UltraSCSI bus technology, and to cost under $5000. It should compete directly with DayStar Digital's recently released multiprocessor Genesis MP clones as well as with high-end Macs from Apple and Power Computing. Umax also plans a PowerPC 603–based machine targeted at the consumer and education markets.

Umax executive Don Chang will head the new

clone maker, with Peter Mehring, formerly head of Radius' clone engineering, as vice president and general manager. The new company will have offices in Silicon Valley.

Radius will continue to support its NuBus-based Mac clones, the 81/110 and the System 100, but will no longer develop new clones.

NEWS FLASH

Apple Ends PowerTalk Development

COPLAND WILL USE INTERNET STANDARDS

by Cameron Crotty

Like the man once said, "You're not going to have PowerTalk to kick around anymore." Apple has announced that its much-maligned, proprietary, integrated E-mail technology—installed on only 10 percent of all System 7.5–based Macs, Apple admits—will not be included in the next major Mac OS revision, code-named Copland.

For Copland's directory, messaging, and E-mail services, Apple intends to use standard Internet protocols (such as SMTP, POP, and MIME), and CyberDog, the company's OpenDoc-based communications tool.

Apple (408/996-1010) will still sell PowerShare 1.1 for System 7.X users, but future versions of the mail server will be based on Internet standard mail protocols.

According to Apple, fewer than 10 percent of System 7.5 users were using PowerTalk, complaining of poor performance, too much memory, and not enough features.

graphics

Macromedia Betters xRes

NEW VERSION BOASTS PIXEL EDITING AND A SENSIBLE INTERFACE

by Cathy Abes

Now in its first incarnation as a Macromedia product, xRes keeps its strong points: a wide array of compositing and painting tools, fast high-res editing, and potent color-management capabilities. But Macromedia's influence can be seen in xRes 2.0's streamlined interface, a direct-editing mode for working with low-res images, and integration with Macromedia FreeHand and Director.

Multimedia developers and Web designers will appreciate xRes 2.0's Direct mode, which processes pixels as you go, just as Photoshop does, letting you work with multiple floating objects, merge objects, drag and drop selections between objects, and clone objects across layers. You can even paint and view transparent and matte colors for use with Director.

All operations are now interruptible. And xRes 2.0 includes several new brushes (sponge, dodge, burn, tint, contrast, noise) and new brush controls (better pressure sensitivity, better flow control, more customizing options).

FreeHand users will feel right at home with xRes's revamped path tools: they work the same way FreeHand's paths do. You can even import FreeHand paths.

Macromedia (415/252-2000, *macropr@macromedia.com*) plans to ship xRes 2.0 in early February for $699.

Sneak PEEK

Director Takes Control

BY JIM FEELEY

Macromedia Director, the World Class–winning multimedia authoring tool, is a powerful yet frustrating tool. Strong control of animation and interactivity hampered by inadequate text tools and a difficult interface have kept all but the most dedicated users from fully harnessing Director's power. But after evaluating an early beta, I'm convinced that Macromedia (415/252-2000, *macropr@macromedia.com*) is well on the way to correcting these shortcomings in version 5.0, which it expects to release this spring.



DOUG ROSS

Director 5's text tools make creating, editing, and managing text much less painful. Like a word processor, its new text editor provides paragraph styles, line and character spacing, and smooth text scrolling. You can drop a single text file onto Director's cast window to create or update multiple cast members in a project. And 5.0's real-time antialiasing lets you render large type in Director rather than import it from a graphics program.

Other big pluses: the new alignment tool and snap-to-grid feature make quick work of time-consuming layout tasks, multiple casts make it easier for several people to work on the same project, and background loading of animations and scenes eliminates the wait that typically follows launching a new scene. In fact, Macromedia claims that titles created in Director 5 will run as fast as those built in C.

Director 5 has a common user interface—including keyboard shortcuts—that will eventually be adopted by all Macromedia programs. Shared features, such as text-alignment tools, will look and work the same.

Director Xtras are extensions or plug-ins that let programmers add features and support for new data types like QuickDraw 3D. You can build your own with Lingo—Director's scripting language—or with C and C++, but Director 5 still supports XObjects.



In Director 4, I would have to hold a ruler up to the screen to align this type. In 5.0, the alignment tool instantly does the job.

If the final version fulfills the promise shown by the beta that I tested, Macromedia Director 5 will continue to be the standard by which other multimedia tools are judged.

"OPENDOC"

continued from page 39

worries that his company wouldn't survive selling components. "We've got this very neatly integrated product," he says. "Does it make sense for us to break it up into parts? What if we go from selling a package for $595 to selling a few parts for $99 each?"

Finally, Apple is facing the classic chicken-and-egg dilemma of high technology: users aren't likely to demand a technology they've never seen in use, and most established developers won't consider a technology their customers aren't demanding. Says Chuck Moozakis, senior marketing writer for Quark, "OpenDoc is something that we're watching closely, but most of the requests have been from the press, not from our customer base."

Even deep in the heart of the Apple camp, the short-term news is not exactly awe inspiring. Apple is working on CyberDog, a group of Internet-access components that has become the poster child for OpenDoc. But the company won't pin down a delivery date any closer than the first half of 1996, when Apple expects to deliver an update to OpenDoc, including some basic components, some viewers, and the Macintosh version of ComponentGlue.

Apple-owned Claris isn't leading the charge, either. Claris only recently joined CI Labs—the multicompany consortium that is charged with promulgating OpenDoc—and would not elaborate on the company's product plans beyond president Guerrino De Luca's statement in November that "Claris intends to ship one or more OpenDoc-compliant products in 1996 and is evaluating opportunities to add OpenDoc container and component capabilities across our product line."

Windows: The Long and Winding Road The closing months of 1995 were rocky for OpenDoc, to say the least. Apple was completing the Mac OS SDK, but not soon enough for some, and the OpenDoc consortium was battling accusations of irrelevancy.

For most large developers, OpenDoc's Windows story is critically important. "OpenDoc has a lot to offer, but 50 percent of our sales are from Windows, and 50 percent are from Mac," says Miles Walsh, vice president of marketing for Macromedia. "Like many companies, we're looking for a cross-platform solution." Without strong system-level Windows software, OpenDoc stands a good chance of living out its life in the backwaters of failed industry standards.

Novell, one of the founding members of CI Labs, developed both the Windows SDK and the ComponentGlue software that lets OpenDoc work with OLE, Microsoft's software-linking technology. But Novell awakened everyone's worst fears by confirming that it was looking for a buyer for its OpenDoc-development group.

IBM Takes Over Finally, in late October, IBM—which was already developing the OS/2 OpenDoc SDK—announced that it would assume Novell's development responsibilities. While some have questioned IBM's ability to follow through—especially in any sort of timely fashion—developers working with early versions of the SDKs for Mac and OS/2 are reassured by IBM's size, if nothing else. "IBM is putting lots of resources into [Windows] OpenDoc development," says Hans Martin Kern, product manager for the Theta Group, a company developing database parts for OpenDoc.

IBM says that it expects to enter beta testing of the Windows SDK in the second quarter of 1996, with final availability by September. While these dates are significantly later than Novell's previous plans (six to eight weeks after the Macintosh software ships), many OpenDoc developers appear unruffled by the delay, probably because most of them are primarily Mac or OS/2 shops. "By the time the Windows SDK ships, we'll be ready to start porting," says one OS/2 developer. Rounding out the platform support, IBM said at press time that it was on track to release the OS/2 SDK in January.

Not Dead Yet Pronouncing OpenDoc dead has become a regular pastime in the computer press, and it's a relatively risk-free stand to take. OpenDoc is facing an impressive array of obstacles, not the least of which is Microsoft. With Office and OLE, Microsoft is trying to achieve at the

continues on page 45

OpenDoc Promises

Most Mac developers were vague about their OpenDoc plans for this year, but some were willing to commit to specific products.

Developer	Product Plans	Estimated Ship
ACI US	Make 4D a container application	uncertain
ADAM	High-end anatomy products	July–September
Addison-Wesley Multimedia Publishing Lab	Math, science titles for higher education	July–September
Adobe Systems	Viewers for Illustrator, Photoshop, and Premiere	May–July
Athena Design	Mesa spreadsheet tool	February–June
B & E Software	RagTime 4.0 document processing	February–March
Digital Technology International	Client for desktop-publishing tracking system	February–June
Eclipse Services	Object Soup database query tools	April–June
Jabra	DocTel telecommunications manager	uncertain
LizardTech	Planet Color Toolkit, Mr. Sid Viewer image compression	January–March
Lumina Decision Systems	Data analysis/modeling tools	July–September
Mango Tree Software	TCP/IP connection tool	April–June
Metrowerks	CodeWarrior will support OpenDoc development	uncertain
Milum	Office Tracker Pro scheduling/to-do–list management	January–March
Mind Share	QuickTime videoconferencing	April–June
Musi Software	Telenavigator Internet access utility	uncertain
Peripheral Vision	PenOp handwriting/signature capture	uncertain
SSG	Client for Perspective 3.0 distributed database	uncertain
Symantec	Symantec C++ will support OpenDoc development	uncertain
Theta Group	Database query tools	January–March
Virtus	Virtus Cube desktop/entertainment utility	January–March
WorldSoft	WorldWrite multilingual word processor	uncertain

Have A New PowerPC PowerBook? Fill In The Blanks.

"Apple cut...on-board Ethernet found on the 500 series."
Stephen Howard - MacWEEK

"They (Apple) don't have built-in Ethernet."
Don Crabb - MacWEEK

"The PowerBook 190 ships with no video-out support..."
Henry Norr - MacWEEK



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"OPENDOC"

continued from page 42

application level the integration OpenDoc is striving for at the operating-system level. The key to such a scenario, of course, is lots of tiny developers writing tiny bits of code that play within the grand environment that is Microsoft Office. So far, that hasn't happened, although many Windows developers have used OLE to link their own programs together.

Even without massive adoption by mainstream developers, OpenDoc isn't going to dry up and blow away, if only because Apple plans to make it an integral part of Copland, the next major version of the Mac OS, due in early 1997. IBM has made similar pronouncements about the next version of OS/2 Warp, due this year.

And despite Microsoft's promises, OLE for the Mac lags seriously behind OLE on Windows and isn't expected to even begin to achieve parity until late this year.

While crunch time could come more quickly than Apple and IBM would like, it's still early in the game for OpenDoc. As David Pollak, president of Athena Design, developer of the Mesa spreadsheet application on the Next platform, points out, OpenDoc has only now been released to developers. Says Pollak, "1.0 software is 1.0 software, and that's OK." What really counts is what happens next.

Special REPORT

Mirror, Mirror on the Wall

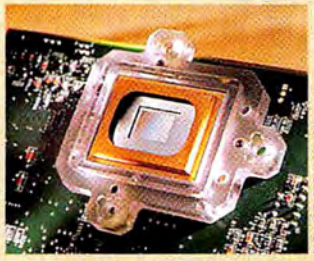
BY CAMERON CROTTY

A mirror is supposed to be the ultimate in impartiality, but in the case of Texas Instruments' new display technology, digital light processing (DLP), thousands of tiny mirrors could make you look better.

DLP systems are based on a chip developed by Texas Instruments called a digital micromirror device, or DMD. The top of a DMD chip is covered with hundreds of thousands of tiny aluminum mirrors, each mounted on a microscopic hinge and individually addressed by the chip electronics. Moving these mirrors while shining light on the chip directs individual light beams through a lens to project an image (see the diagram "Mirror, Mirror on the Chip").

Although still an infant technology, DLP could give both LCD and CRT displays serious competition. LCD panels are difficult and expensive to make and are plagued by slow refresh rates. And anyone who has ever had to lug around a 21-inch monitor knows firsthand the size and weight penalties that CRT technology carries. DLP systems, on the other hand, do not depend on heavy glass tubes; they deliver high-quality, flicker-free images; and they have the potential to be inexpensively mass-produced.

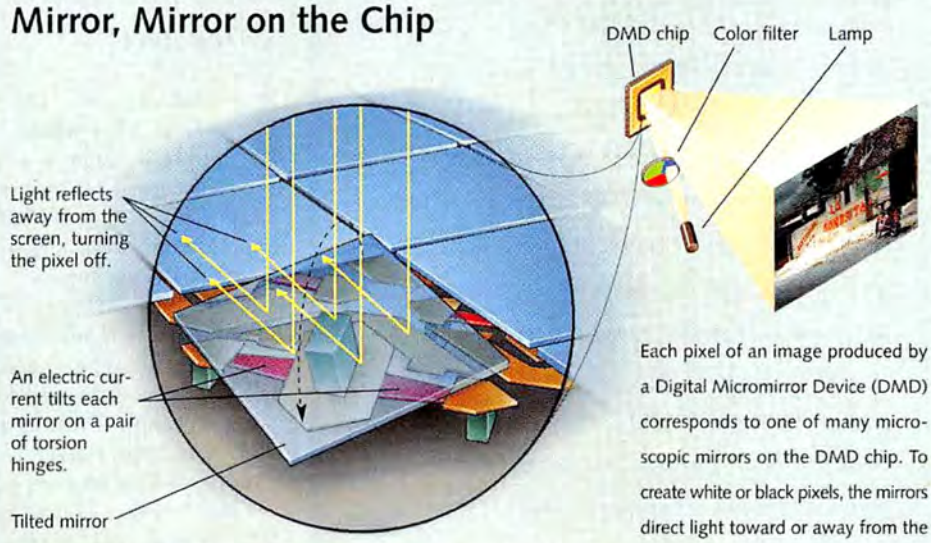
DLP systems will appear first in projectors designed for multimedia presentations, a market currently dominated by LCDs. nView (804/873-1354) will be the first to market with its $9495 DLP-based Diamond D-400. Other vendors, such as Proxima (619/457-5500) and In Focus (503/692-4968), hope to ship products in the first half of 1996.



RICHARD RETHMEYER

A DMD chip up close.

Mirror, Mirror on the Chip



Each pixel of an image produced by a Digital Micromirror Device (DMD) corresponds to one of many microscopic mirrors on the DMD chip. To create white or black pixels, the mirrors direct light toward or away from the screen by tilting either forward or back to flat. To make gray shades, the mirrors tilt back and forth at varying intervals to create dimmer or brighter pixels—flickering so quickly that you see only a single shade of gray.

Three-chip systems are under development, but vendors can achieve color displays with a single DMD chip by shining white light through red, green, and blue filters mounted on a rapidly rotating wheel. Each pixel cycles through the primary colors so quickly that your eye mixes them and you see only the intended color.

multimedia

Web-Based Multimedia for the Masses

DELTAPOINT'S BITE-SIZE AUTHORING TOOLS

by Cameron Crotty

Want to put your own multimedia up on the World Wide Web? Can't afford to drop a grand on Macromedia Director and the ShockWave tools? Been avoiding Java because your C programming skills are kind of rusty?

DeltaPoint (408/648-4000, *deltapoint@aol.com*), best known for its DeltaGraph Pro charting and presentation software, has announced a multimedia authoring and playback system that is inexpensive, easy to use, and produces files a fraction the size of Director files.

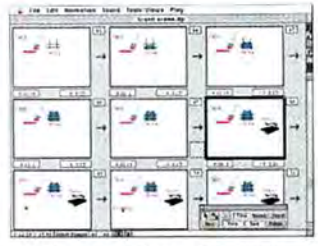
Web Animator relies on vector-based graphics for most of its space savings. Vector-based systems break an image down into a script that defines how the image was created: its colors, predefined objects (such as circles, squares, and polygons), text, and lines. The Web Animator player acts as an interpreter, reproducing each image and its animations from the script's instructions. By contrast, bitmap graphic systems save the position and color of each pixel in an image, which requires dramatically more space to store and proportionally more time to transmit. Vector-based graphics are hardly a new idea—the PostScript language does the same thing for printers—but they are new to the Web.

Web Animator can import QuickTime movies, PICS animations, and PICT images, although, as with sounds, users will sacrifice some file-size benefits when they use these non-vector-based elements.

DeltaPoint's goal is to create useful animated presentations with sound in the 10K to 50K range, just the right bite size for modem-based Web surfers.

Web Animator's authoring tool is aimed at a much less sophisticated audience than the typical Director jockeys, with no scripting and most features accessible via point and click or via drag and drop. Presentations that are under construction are shown as storyboard slides, which helps when you're envisioning the project as a whole and when adding animations and sounds. You can automatically animate an element by placing it in a keyframe, then changing its position in a subsequent keyframe. Web Animator also simplifies sound handling by automatically synchronizing actions and sounds, subtly slowing or accelerating animations as necessary.

You can add buttons to make presentations interactive; buttons can branch to another slide or series of slides, or they can be embedded with an URL that takes users to a Web site.



Web Animator's storyboard interface vividly displays how your multimedia presentation is developing. From here, you can add sounds, graphics, and animations to the mix.

The Web Animator authoring tool will list for $295, but DeltaPoint expects it to sell in stores for closer to $100. The company says the player will be available free for Windows and Macintosh as a stand-alone application, as well as a Netscape Navigator plug-in. DeltaPoint hopes to ship Web Animator by June.



ROBERT PERRY

Zooming In on Digital Cameras

More features and higher-quality pictures are the selling points as camera companies attempt to push point-and-shoot digital cameras into the mainstream market. Kodak's (716/724-4000) Digital Science DC50 and Dycam's (818/407-3960, *dycam@aol.com*) 10-C, pictured here, both sport motorized zoom lenses and removable PC Card memory. The DC50 has slightly higher resolution and a slightly lower street price (expected to be under $1000)—Dycam plans to sell the 10-C for under $1100. For professional users, Agfa (201/440-2500) offers the StudioCam for still photos and the ActionCam for motion photography, both costing $9499.—CAMERON CROTTY

multimedia

Virtual Reality Check

A CHALLENGER FOR QUICKTIME VR ENTERS THE ARENA

by Jim Heid

Look around, QuickTime VR—you're not the only game in town. A virtual-reality technology called PhotoSphere, from Omniview (423/690-5600), is moving in.

Like QuickTime VR, PhotoSphere lets multimedia and Web designers create navigable panoramas and supports multiple locations—users can jump among locations by clicking on a hot spot.

But while QuickTime VR's vertical field of view is limited to approximately 95

degrees (depending on the lens used to shoot the original scene), PhotoSphere provides a full 180 degrees so you can look straight up or down. It's as if QuickTime VR places you inside a cylinder whose top or bottom you don't see, whereas PhotoSphere puts you inside a bubble, where you can see, for example, the ceiling and floor of an interior.

But PhotoSphere does have some drawbacks: You have to take the original photos with a 35mm camera and a relatively expensive (about $1500) fish-eye lens; you can take QuickTime VR images with virtually any type of lens and camera, even a digital camera or a camcorder. Lighting interior spaces can be "extremely challenging," says Keith Jones, a photographer who has worked with PhotoSphere images. And since the fish-eye lens can't help but capture the tripod—you need one to take VR photos—you must use Photoshop or a similar program to remove it from the final image.

Also, PhotoSphere has no equivalent to QuickTime VR's object movies, which let you "pick up" and examine objects from various angles. But because a fish-eye lens can see 180 degrees, a PhotoSphere photographer can capture an entire panorama with just 2 photos, compared with 8 to 36 photos for QuickTime VR.

Scheduled to ship this spring on both the Mac and Windows platforms in various configurations starting at under $500, PhotoSphere is expected to include Macromedia plug-ins that add PhotoSphere playback support to Director and Authorware. Omniview's Web site (*http://www.usit.net/omniview*) contains free 680X0, Power Mac, and Windows versions of the PhotoSphere player as well as numerous sample images.



While a QuickTime VR scene has no top or bottom, Photosphere displays a scene with no vertical or horizontal boundaries.

communications

E-Mail Competition Heats Up

CC:MAIL OFFERS A MORE MAC-LIKE VERSION

by Matt Clark

For years Macintosh cc:Mail users have suffered with electronic-mail clients designed primarily for their PC cohorts. Now, Lotus's (617/577-8500) cc:Mail for the Macintosh release 3 brings an E-mail client designed with the Mac in mind.

With the new version of cc:Mail ($95 for a single user, $495 for a ten-user pack), Macintosh mailers can keep aliases of mail folders, bulletin boards, messages, and addressees on the desktop for easy access. The Macintosh client also finally supports rules-based filtering, letting you more easily separate real mail from junk.

Dealing with attachments is also less of a hassle, as Lotus has included 150 file viewers with which you can read, scroll, and print attached files—even if you don't have the application in which they were created. These viewers support both Mac and PC file formats.

continues

Internet WATCH

BY CAMERON CROTTY

AOL Opens Its Doors America Online is opening its proprietary network so it can tie more software developers and users to its service. With the Developers Studio software developer kit (SDK), developers can build complete applications with custom user interfaces that connect directly to America Online (703/893-6288, *info@aol.com*).



Developers have other options: they can launch the AOL client with a single button-click in their applications, they can write add-on apps for the AOL client, and they can provide real-time connections for multiplayer games with a new games API.

Calling All Macs Avoiding long-distance telephone bills by chatting over the Internet has become all the rage on the PC, but until recently Macintosh blabbermouths were out in the cold. Camelot (214/733-3005) has purchased NetPhone (also known as ePhone), and will transform it into a Mac version of the company's Digiphone software. Camelot promises a full-featured Mac client, supporting full duplex calls and encryption.

Vocaltec's (201/768-9400, *info@vocaltec.com*) Internet Phone requires users to log in to an IRC (Internet Relay Chat) server, although the software uses the IRC connection only for addressing, not for transferring audio data. Vocaltec also plans to publish a programming interface for Internet Phone so that developers can use the software to provide a two-way audio connection—in an online game, for instance. Vocaltec said it would cost roughly the same as the PC version, which lists for $99.



Better CompuServe, Prodigy CompuServe subscribers with Macs are anxiously awaiting MacCIM 3.0, which will integrate a Web browser directly into the connection software, and is expected to ship sometime this spring. In the meantime, CompuServe (614/529-1349) has said it will not create a Mac version of NetLauncher (a Windows utility that automatically configures your machine for a TCP/IP connection to CompuServe). Currently, Macintosh users can download all the pieces for a TCP/IP connection (except MacTCP) from CIS, then run a configuration utility to complete the setup.



DOUG ROSS

In January, Prodigy (914/962-0310) expects to begin beta testing its new Mac client, featuring improved mail and chat functions.

Media WATCH

BY JAMES A. MARTIN

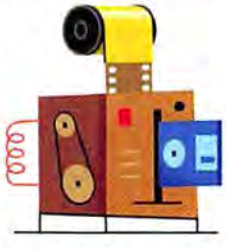
The Web Gets Moving With Macromedia's (415/252-2000, *sales@macromedia.com*) Shockwave technology, content developers on the World Wide Web can now easily add interactive multimedia presentations—such as product demonstrations, short tutorials, and educational videos—to their Web sites. Shockwave is a plug-in authoring environment for Macromedia Director 4.0. The technology consists of two main components: Afterburner, a utility that compresses Director movies and prepares them for uploading to an HTTP server, and the Shockwave player, a helper application for Netscape Navigator 2.0 and other Web browsers. The player lets the Web user download and view the multimedia presentation within the same browser Web page. Afterburner is available free to Director 4.0 users from Macromedia's Web site (*http://www.macromedia.com*).



Three Media in Nine Ounces Picture this: a single device that captures high-resolution digital photographs, audio, and full-motion video sequences—and is small enough to put in your pocket. Ricoh's (201/625-4180) RDC-1 electronic camera can record as many as 492 still photos; four video clips of five seconds each (including sound); or 100 minutes of digital audio on one 24MB PC card (with the help of Ricoh's JPEG-compatible compression technology). Scheduled to ship this spring, the $1800 RDC-1 generates still and video images with resolutions as high as 768 by 480 pixels, and has a 3× continuous-zoom lens ranging from 7mm to 21mm. You can view images on location with an optional 2½-inch color LCD monitor ($500) and save files in TIFF, AVI, PCX, and WAV formats. The petitecamera, which measures only 5¼ by ¾ by 2¾ inches and weighs in at a mere 9 ounces, hooks up to a standard television monitor—making the RDC-1 a portable presentation player, too.



New Developments on the Web If you're taking photos that you plan to include on your Web home page, why not skip the time-consuming scanning and have your Photolab post digital images on the Internet for you? All you have to do is mail your slide or print film to Seattle Filmworks (206/281-1390, *sfwcs@fine.com*) and request the company's new PhotoMail service. Once your film has been developed, you'll get a password for accessing the photos and you can then download the digital images (at 640-by-480-pixel resolution) from the company's Web site (*http://www.filmworks.com*). The digital photos are in Seattle Filmworks' proprietary format, but the company's PhotoWorks software, also available free from the Seattle Filmworks Web site, lets you convert images to any of the standard graphics file formats, such as TIFF. The company also sends you hard-copy photographs in the mail, along with a floppy disk containing the digital images. The PhotoMail service adds $3.95 to the cost of processing your film for 20 or 24 exposures, and $5.95 for 36 exposures.



For the Internet-address-impaired there are addressing assistants, templates that show how to put together complex E-mail addresses. But Internet addressing isn't all wine and roses: you must keep all your Internet entries in a single, separate address book, and you can't include Internet addressees in permanent groups.

Elsewhere on the E-mail battlefield:

- CE Software (515/221-1801) will be adding 25 features or enhancements to its venerable QuickMail, including a native client, TCP/IP support, and Open Transport compatibility.
- Netscape Communications (415/528-2555, *info@netscape.com*) recently introduced Netscape Mail Server,



Netscape Mail Server includes hyperlinks for accessing Web pages, FTP sites, or any linkable destination.

which promises to integrate your enterprise E-mail system seamlessly with the Internet's.

- StarNine (510/649-4949, *info@starnine.com*) will be unveiling a makeover of its recently acquired Microsoft Mail as StarNine Mail by April. Look for some initial incompatibility and bug-fixes along with a UUCP gateway bundle. A version 4.0 release is planned later in the year; it should include rules, as well as support for POP3 mail clients. No word yet on a new release of AppleMail for PowerTalk. StarNine itself was recently acquired by Quarterdeck, but the acquisition won't affect the Mac mail products.

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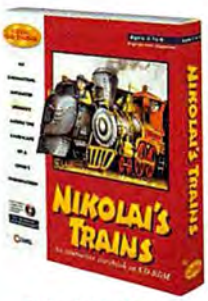
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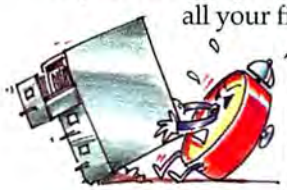
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1. *Beware of dragging files.* If you've been "backing up" by dragging files, you'll have an unpleasant discovery when it's time to restore. Even if you've kept up to date with all your files (sure, sure), what you'll still be missing is every preference, configuration, and font – all the stuff that reflects the way you work.



Think about this the next time you're "backing up" by dragging: Retrospect can scan 200 files a second to see which files have changed. Can you?

2. *Recovery tools don't recover everything.* At best, it's a partial recovery. At worst, you have a fire, flood, or theft, and those tools won't recover anything.

3. *Other backup software leaves you exposed.* You're forced to individually restore each incremental backup. The dentist's more fun than that. Only Retrospect has SnapShot™ technology that tracks the most recent state of your hard drive. So complete restoration is accomplished in just one step, in only minutes.

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New Products

THE LATEST MACINTOSH RELEASES

COMMUNICATIONS

Wireless Connections

Wired is tired—wireless is where it's at. Whether your communications needs are high-powered or basic, one of these products should fit the bill.

• With Megahertz's (801/320-7000, *salesinfo@mhz.com*) $499 All- Points Type II PC Card plugged into your PowerBook or MessagePad, you can hook into the RAM Mobile Data Network to send and receive E-mail and faxes, access databases, and transfer files anytime, anywhere.

• If you have less demanding connection needs, Socket Communications' (510/744-2700, *info@socketcom.com*) $399 PageCard Wireless Messaging System might fit the bill—it's simply an alphanumeric pager on a PC Card, with software to help you manage your pages.

DISPLAY

Color Monitors

If you're a graphics professional in need of a sharp new display with accurate colors, check out these four new monitors—all aimed at the graphics market.

• Apple (408/996-1010) has introduced a new 17-inch monitor, the AppleVision 1710, with an estimated price of $1000.

• CTX International (909/598-8094) has a 17-inch and a 20-inch monitor—the 17XA DiamondTron ($1199) uses Mitsubishi's DiamondTron version of the Sony Trinitron picture tube; the 2085 ($1479) uses a standard tridot tube.

• Samsung Electronics' (201/229-4000) 21-inch SyncMaster 21GLs ($1999) offers front-panel controls and a coated screen to eliminate surface reflection.

• ViewSonic's (909/869-7976) 21-inch ViewSonic PT810 ($2495) has 20 onscreen adjustment settings and a coated screen to eliminate glare and reflection.

Video Adapter

Get a better look at things on your LC-model Macintosh with Focus Enhancements' (617/938-8088, *focus@applelink.apple.com*) $399 LC 2417 Video Card. The card plugs into the Processor Direct Slot and supports 24-bit color on monitors up to 17 inches, 16-bit color on 19- and 21-inch monitors.

ENTERTAINMENT

Murder Most Foul

You say you're depressed because you had to sit on the sidelines during the O.J. Simpson trial? Well, Broderbund's (415/382-4400) $50 In The 1st Degree puts you in a San Francisco courtroom, as a prosecutor trying to unravel a web of conflicting motives and build an airtight case against a defendant who stands accused of murder.

GRAPHICS

Image Editing for the Masses

After years of owning the professional image-processing market with Photoshop, Adobe Systems (415/961-4400) has finally given us an image-editing program that anyone can use. Geared for the consumer market at a company-estimated price of $89, PhotoDeluxe features an easy interface and templates that guide first-time users through a variety of photo projects, such as combining different photographs into a single image, creating a calendar with photos, and enhancing less-than-perfect photos.

Map Software

See the entire globe without ever leaving your computer with two new map collections and an Illustrator plug-in for printing maps on PostScript devices.

• Magellan Geographix (805/685-3100, *info@magellangeo.com*) is shipping MGDigitalEarth, a comprehensive library of high-resolution satellite maps of the world. Prices for the MGDigitalEarth maps range from $50 to $200.



MapArt Cartographic Data Bank

• The MapArt Cartographic Data Bank from Cartesia (609/397-1611) is a two-volume collection of detailed maps that can be edited in Adobe Illustrator 5 or Macromedia FreeHand 5. The volumes (USA and World) sell separately for $249; together they're $399.

• The $395 MAPublisher, from Avenza Software (905/639-3330, *info@avenza.com*), is a suite of six plug-ins that lets you import Geographical Information System data into Illustrator 5.5, and print high-resolution maps and spatial renderings to any PostScript device, with all attributes intact.

36-Bit Scanning

Looking to capture as many pixels as possible? Two high-resolution scanners are designed to give graphics professionals the quality they need.

• For those who frequently alternate between scanning transparencies and reflective art, Agfa's (508/658-6285) DuoScan provides two scan beds for independent control over the focal length of the optical path. Instead of switching light sources, the DuoScan switches mirrors, using an optical path that's optimized for scanning either transparencies or reflective originals. The dual beds also enable you to set up one type of scan on one bed while the other scan is in progress. With an optical resolution of 1000 dpi, the $5500 DuoScan comes with Agfa's FotoLook, FotoTune, and FotoFlavor software, plus Adobe Photoshop.

• Geared for the graphics professional, the PowerLook II is a $3495, 600-dpi flatbed scanner from Umax Technology (510/651-8883) that captures 12 bits per RGB channel for a total bit depth of 36 and has a maximum density of 3.2. Features include batch scanning, descreening, autoexposure controls, and color calibration. Third-party software bundled with the PowerLook II includes Adobe Photoshop, Kai's Power Tools and Photo CD sampler, and Pixar Typestry.

MULTIMEDIA

Digital Portfolio

Want to show off your graphics and video in the best possible light? You can put together a professional-looking portfolio with the $77 ProView, a multimedia authoring tool sold direct by E-magine (212/262-0223). ProView 1.1 creates standalone presentations containing pictures, movies, text boxes, and sounds, plus hot spots that link pages, photos, sounds, and spoken text.



ProView

PUBLISHING

PageMaker Plug-Ins

Just in time to give PageMaker 6.0 users a boost in productivity, the $149 PageTools 2.0 from Extensis (503/274-5050, *info@extensis.com*) features eight new plug-ins along with enhancements to the original ten. Although it exploits new PageMaker 6.0 features, PageTools also

continues

New MasterJuggler 1.91

Take Control of Your Fonts!

Throwing every font into the System folder slows down you and your Mac. You have to put up with long font menus, slow application launching, and a bloated System folder. Your Mac can only handle 128 font suitcases so if you have a large font library, you're also forced to quit all your open applications and drag fonts in and out of the System folder. Get a grip on your fonts. Restore speed, convenience and control with MasterJuggler!

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Font Experts Choose MasterJuggler

"[Since] the Mac doesn't provide such font management luxuries... I recommend MasterJuggler [over Symantec's Suitcase]; it's easier to use and has a much more up-to-date manual."
Jim Heid, Macworld Magazine 5/95

"You should definitely consider MasterJuggler (unless, of course, your little secret is that you *like* juggling all those fonts yourself)."
Tamis Nordling, Adobe Magazine 3/95

"We recommend MasterJuggler, which matches the venerable Suitcase feature for feature (and beyond) and is *much* easier to use."
Aileen Abernathy, MacUser 8/95

Reliability & Compatibility That's Unmatched

MasterJuggler is fully compatible with all major desktop publishing and graphics software. And MasterJuggler is the only font manager compatible with System 7.5, QuickDraw GX and all Power Macs including the new PCI Macs.

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New Products

supports 5.0 for those who haven't yet upgraded. The new plug-ins let you apply character-level styles, count words and characters, resize multiple objects, draw crop or registration marks, apply tab settings to selected text, and capitalize words or letters.

Large-Format Ink-Jets

You can get high-quality full-color output from these wide-format color ink-jet printers for signs, posters, and banners, as well as CAD, engineering, architectural, and geographical information applications.



TechJet 175i

• Calcomp's (714/821-2000) $9995 TechJet 175i offers four-pass and bidirectional printing at 360 dpi. Options include a PostScript Level II RIP and an Ethernet interface. The TechJet Color GT series includes the 5324 GT, $5295, which produces D-size output, the 5336 GT, $5995, which produces E-size output, and the 5336 GT/PS, $6995, which includes a PostScript-compatible interpreter.

• Encad's (619/452-0882) $9995 NovaJet Pro produces 36-inch output with Encad's NovaInk continuous-ink-delivery system and scientifically matched inks and media. The NovaJet Pro's 500-milliliter ink reservoirs can be refilled during printing.

Job Management

Need a manager to keep your design jobs on track? Here are two products that make it easier to juggle schedules, estimates, and customers.

• Job Central, from Honeybee Software (514/989-5030, *fourthpwr@aol.com*), is a $695 workflow-management system for ad agencies, design firms, and multimedia producers that does estimating, scheduling, billing, status reporting, and other related tasks.

• GD Estimating, by John Cole (505/466-7311; *jcolegraph@aol.com*), is a $185 template you can use with ClarisWorks 2.0 or Excel 3.0 to calculate unit or hourly costs automatically for such tasks as photography, illustration, scanning, text alterations, image archiving, and printing.

Font Organizer

Tired of hassling with missing or misplaced fonts? Let Suitcase do it for you. The Power Mac–accelerated version 3.0 of Symantec's (503/334-6054) font manager lets you organize fonts by family, size, or project. You can link fonts to commonly used applications and specific jobs for automatic access. Suitcase compresses screen fonts up to 60 percent and automatically decompresses them. It also resolves font conflicts on the fly when you load new fonts into the system. Suitcase 3.0 retails for $69.95; an upgrade from 2.X is $39.95.

STORAGE

CD-ROM Writing

Burning your own CD-ROMs just got faster and cheaper thanks to Pinnacle Micro's (714/789-3000) $1295 RCD 5020, a double-speed CD-ROM recorder/player with 1MB of cache.

CD-ROM Serving

Once you've created a stack of discs, serve them up on the network with one of Optical Access International's (617/937-3950, *oai@oai.com*) CD/Maxtet series. Available with 8, 14, or 35 drives, in 4× and 6.7× speeds. List prices start at $5995.

RAID Arrays

Even hard drives get lonely, unless they're spinning with some siblings as part of a RAID array. Here are two systems that can ease your storage woes.

• The SCSI-2 Renegade RAID System (price varies with configuration) from MountainGate (702/851-

9393, *sales@mntgte.lockheed.com*) can handle up to ten 3.5-inch drives, and can be configured with up to two removable drives for data transport.

• For the fortunate possessors of PCI-based Macintoshes, Direct Connections (612/937-9771, *dconnect @skypoint.com*) offers speed, speed, speed, in the form of the $7799 DC1200 six-drive, 12GB RAID array. The DC1200 comes with two Adaptec PowerDomain 2940W PCI controllers.

SYSTEMS

LC Acceleration

It isn't a PowerPC chip, but Sonnet Technologies' (714/261-2800) $199 Presto 040 accelerator will breathe Quadra life into your LC-class Mac. The card plugs into the Processor Direct Slot and carries a 50MHz 68040 chip. An optional FPU bumps the price to $299.

PowerBook Accessories

Even a fresh crop of PowerBooks would be powerless without a new line of battery accessories. Battery Technology (213/728-7874, *batterytech@applelink.apple.com*) obliges with the $220 MC-1950 NiMH battery and the $99.95 MC-SC1950 charger for the PowerBook 5300 and 190 series. BTI also has an adapter (the $80 MC-PS45) that's smaller and lighter than Apple's, and one (the $100 MC-AP45) that plugs into your car's cigarette lighter.

TITLES

Enter the Third Dimension

If you've ever thought of venturing beyond the familiar world of two-dimensional design, take a look at Don and Melora Foley's *Animation and 3D Modeling on the Mac*, a $35, 144-page book from Peachpit Press (510/548-4393, *orders@peachpit .com*) that introduces you to top animators and 3-D artists and the programs they use—including Macromedia Director, Adobe Premiere, Specular Infini-D, Ray Dream Designer, Strata Studio Pro, and many more.

Heaven and Earth

Give 'em the sun, moon, stars, and that little bit of ice plowing toward Jupiter at intergalactic speeds. The $55 Redshift 2 CD-ROM from Maris Multimedia (415/492-2819) adds new photos and movies, guided tours of the solar system, and an improved star display.



Redshift2

When you're ready to come back down to earth (mentally and culturally), Graphix Zone (714/833-3838) suggests the $40 America's Funniest Home Videos: Lights, Camera, InterAction. You plug video clips from the television show into one of 30 story lines, and watch the results.

UTILITIES/TOOLS

Virus Detection

Is it safe? Only you can prevent the spread of viruses, but McAfee (408/988-3832), known for its Windows antivirus software, is now offering VirusScan for the Macintosh for $50.

Synchronization and Backup

Now native for the Power Mac, the $129 version 2.5 of PowerMerge from Leader Technologies (714/757-1787) features automatic scheduled operation, automatic synchronization or backup on volume mount, and an improved duplicate file locator.

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Reviews

Adobe After Effects 3.0

MUST-HAVE VIDEO-DESIGN PACKAGE ENHANCES MOTION CONTROL AND ADDS EFFECTS



ALLEN WALLACE

AFTER EFFECTS, A POWERFUL video-effects and broadcast-animation program, has been a must-buy application for video producers of everything from CD-ROMs to commercials to films. After Effects 3.0 adds enhanced video-manipulation features and tighter integration with its Adobe siblings.

You can purchase After Effects 3.0 as a $995 base version, from standard software-distribution channels, or as a $1995 Production Bundle, from Adobe value-added resellers. The version I tested includes the Production Bundle, additional effects and functions that will appeal to video professionals; except where otherwise noted, the features I describe are in both versions.

After Effects now ships on a CD-ROM, which contains sample movies, application tips, and demonstration versions of MetaTools' Final Effects (plug-in effects modules). Unfortunately, Adobe did not completely do away with copy protection. The Production Bundle comes with a hardware key that plugs into the Macintosh's ADB port (a dongle). The program functions without the dongle, but the extra plug-ins are not available without it.

The After Effects World

After Effects isn't a general-purpose video editor the way Adobe Premiere or Avid VideoShop are. While you could use After Effects to create simple cuts and dissolves between scenes, people commonly use it to supplement an editing package. Its primary specialty is motion-based effects that involve multiple image layers: moving text, images, and video clips superimposed over full-screen video or patterned backgrounds.

The basic operating style of After Effects remains unchanged in this version. You work in two main windows: the Comp window, a large pasteboard on which you can layer and position elements such as video clips, text, and still images; and a Time Layout window, which you use to control how the position and characteristics of elements change over time. A set of elements and their associated motion and effects settings is called a *composition*.

A typical project begins with importing elements—QuickTime movies, PICT images, sound clips, or motion sequences or still images created in the Electric Image 3-D rendering package. To work with elements created on a PC or work-

RATINGS Outstanding ★★★★★ = 9.0–10.0 Very Good ★★★★ = 7.0–8.9 Good ★★★ = 5.0–6.9 Flawed ★★ = 3.0–4.9 Unacceptable ★ = 0–2.9

station, you may have to use a conversion program such as Equilibrium's DeBabelizer—which could significantly lengthen production time.

Version 3.0 supports Adobe Photoshop 3.0 files and filmstrips. After Effects retains all the layering information specified in Photoshop 3.0 files, including transfer modes and transparency settings, streamlining production if you use Photoshop to prepare still artwork.

After Effects also now supports Adobe Illustrator files (versions 1.1 through 5.5). Illustrator documents remain in their vector-oriented form until rendering time, so you can scale an image's proportions over time while retaining its sharpness—perfect for titles in which the camera appears to zoom through a letter (see "Go After Effects"). When you render with After Effects' best-quality option, the program antialiases the edges of the art.

Adobe has added support for video recorded using D1, a professional format in which pixels are rectangular rather than square as they are on the Mac. After Effects can import D1 video and reconcile the difference so that the video displays correctly, and it can output finished movies in the NTSC and PAL variations of the D1 format.

Making Motion

After importing source elements, you drag them into a Comp window, where you can position and resize them. One project can have numerous Comp windows, and you can nest one composition within another to simplify working with complex projects or to reuse parts of a project.

After Effects' Comp window provides a canvas that is much larger than a final movie's actual proportions. This enables you to position an element completely outside the movie's boundaries and then have it fly into the frame.

Creating such a *motion path* involves using keyframes. Position the element at its initial position, move to a different point on After Effects' timeline ruler, and then move the element to its destination location. After Effects then interprets the path the element must take to get from point *A* to point *B*.

That's a simplified description. After Effects provides far more sophisticated motion controls than any other video-effects program. With the Timeline window, you can create multiple keyframes for a motion path to specify that an element change speed or direction along its path. You can draw Bézier curves to control speed or grab individual control points and drag them.

Creating and manipulating keyframes and motion paths is easier than in previous versions, thanks to a streamlined interface. You can now specify speed by



Go After Effects The Timeline window (bottom) lets you control keyframe positions and the characteristics of all of the project's elements. The Project window (top left) shows the elements you've imported, while the Comp window (top right) is where you position and resize the layers in a composition.

specifying absolute values, such as 35 pixels per second. Most significant, however, After Effects now treats time and motion as two distinct attributes, enabling you to edit the shape of a clip's motion path independently of the clip's speed along the path. And you can specify that keyframes *rove*—move forward or backward in time—to create smooth changes over several keyframes.

Enhanced Effects

Another significant improvement is the ability to apply more than one effect to an element. In previous versions, applying more than one effect was cumbersome; in 3.0, you can easily apply up to 32 effects to a single layer. A new Effects Settings window lets you control the settings of each effect and the order in which to apply them.

After Effects 3.0 also provides better support for Adobe Photoshop filters. (Some Photoshop filters—Variations, Filter Factory, and Texture Fill—don't work in After Effects, however.)

As for masking, previous versions supported only oval, rectangle, and polygon mask shapes. After Effects 3.0 replaces polygon masks with Bézier masks, which provide Illustrator-like control points that enable you to create precise mask shapes.

After Effects will run on any Macintosh II– or Quadra-class machine, but anything less than a Power Mac is frustratingly slow. A PowerPC 604–based machine is best—Adobe says version 3.0 has been optimized to take advantage of the 604 chip.

After Effects 3.0 remains an audio weakling. You can vary the volume of an audio track over time, but there are no audio effects or sophisticated processing options. Audio is best handled by plug-ins such as those from Waves (see "The Mac Recording Studio," *Macworld*, December 1995).

What differentiates the Production Bundle from the base version are some tremendously useful plug-ins for broadcast professionals and advanced multimedia developers. A set of keyframe assistants allows you to draw complex motion paths with the mouse in real time and calculate motion paths using a built-in scripting language. A Motion Stabilize command removes handheld-camera jitter, while a Motion Tracker command lets you synchronize the location of one element with an exact point on another element. The Production Bundle also includes significant enhancements to After Effects' keying features, nine additional distortion filters, and plug-ins for controlling high-end digital disk recorders from Abekas and Accom.

The Last Word

Both After Effects versions provide the same top-drawer rendering quality. However, the Production Bundle is well worth the extra grand for video professionals. The creators of After Effects 3.0 did an A-plus job of making this already unparalleled program better while also bringing it into the Adobe fold. If you're a video producer whose work requires digital effects, you need After Effects.—JIM HEID

RATING: ★★★★/8.4 **PROS:** Superb rendering quality; unmatched control over motion and time; enhanced compatibility with Photoshop and Illustrator; excellent documentation. **CONS:** Production Bundle is copy protected; limited audio tools. **COMPANY:** Adobe Systems (415/961-4400). **LIST PRICE:** Base version $995; Production Bundle $1995; upgrade from version 2.0 to Production Bundle $99.

PageMill 1.0

DRAG-AND-DROP WEB PUBLISHING MASKS HTML COMPLEXITIES

NOBODY LIKES WRITING HTML documents using a text editor. OK, there are a few people who do, but these are the same ones who wax nostalgic about command-line interfaces and the joys of writing your own operating system. Stand next to them at a party, and you can hear how they put together a scale model of the galaxy using only toothpaste and Fruit Loops.

PageMill is aimed squarely at fledgling Web publishers who want a simple and intuitive page-layout tool for designing Web pages. It's meant to replace the mixed bag of utilities that Web masters have been using to cobble together pages, and to alleviate the need to hand-place the proper HTML tags in files. PageMill embeds the tags behind the scenes so you can work in a WYSIWYG environment.

This approach will annoy some users. PageMill insulates you from the HTML tags, not even offering a view-source option. Traditionally, Web-page authors have used text editors with add-on tools specific to Web pages—a process that offers finer control over the results. PageMill doesn't offer that level of control, but it's easier to use and has better image tools than competing programs like SoftQuad's HoTMetaL Pro (see *Reviews*, January 1996) or Bare Bones Software's BBEdit.

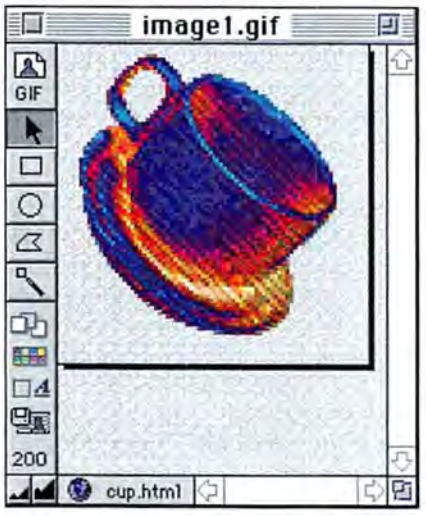


Image View In edit mode double-click on an image to scale it, interlace GIFs, create clickable image maps, and make GIF backgrounds transparent.

Working with Pages

You create your Web pages in the Page View window, which toggles back and forth between edit mode and browse mode so you can track your progress. It's easy to cut and paste objects and text, and the software has standard Mac keyboard equivalents for nearly all the formatting. The mouse-inclined can use the Attributes Inspector, a floating palette that lets you manipulate highlighted text and objects using simple formatting and linking controls. You also use this palette for controlling background patterns and colors, as well as text color.

While the Attributes Inspector is useful for making changes to existing documents, the program's other floating palette, the Pasteboard, is better for creating new pages. Preassemble the images and hypertext links you intend to use on the Pasteboard, then drag and drop them onto a Web page. You also can store regularly used images, like buttons and icons, on the Pasteboard for easy access.

Creating HTML forms is just as simple. Select form elements from a tool bar and place them on the page. Double-click on them to edit the text or size, or drag them to new locations on the page. Creating these forms by hand-placing tags isn't fun, so the ability to quickly mock up new forms and change existing ones is a major advantage. But don't let this lull you into a false sense of accomplishment. PageMill only writes HTML scripts, not the CGI scripts needed to process the data people will enter in these forms.

PageMill can open existing HTML pages, including those that contain tags PageMill doesn't recognize, like the table tags in the proposed HTML 3.0 standard. PageMill displays these unsupported tags in red on the page, as "raw" HTML. You can also enter such tags into your documents manually. PageMill attempts to stick to the HTML 2.0 standard but deviates on a few points, favoring certain Netscape extensions.

Playing with Pictures

PageMill's image-handling tools are perhaps its most impressive features. The drag-and-drop placement of images works particularly well for designers who want to experiment with new designs and modify existing layouts. Using the Image Editor mode, you can give images a transparent background, create a clickable image map, or link the image to a URL—all of which PageMill handles nicely. Other Web-authoring tools don't offer this functionality; you have to use a handful of utilities to accomplish these tasks.

While it's also possible to use PageMill to translate PICT files into GIF or JPEG format, it's not particularly efficient. You are better off preparing your images with Adobe's Photoshop or Equilibrium's DeBabelizer first, to reduce color palettes and file size for Web-friendly downloads.

The Last Word

PageMill's creators faced a daunting task: bringing an easy-to-use interface and flexible design tools to a page-display system without solid layout structures. Imagine Michelangelo trying to sculpt *David* from Silly Putty and you get an idea of what designers face in creating HTML pages. PageMill doesn't solve the many challenges of this new medium, but it begins to address them in elegant ways with an interface that encourages experimentation and quick manipulation of page elements. PageMill needs an expert mode or plug-in architecture that allows users more-direct access to HTML tags. But overall, the program is a welcome addition to the toolbox of just about any Web developer.—MATTHEW HAWN



Attributes Inspector This floating palette lets you examine and change the formatting of your Web pages. A color picker (not shown) lets you select background colors.

RATING: ★★★/6.9 **PROS:** Ease of use; tools for manipulating graphics and designing forms. **CONS:** No expert mode to work directly with the source code; browse mode doesn't support external link checking. **COMPANY:** Adobe Systems (415/961-4400). **LIST PRICE:** $149.

MessagePad 120 with Newton OS 2.0

IF THE FIRST NEWTON HAD BEEN THIS GOOD, YOU'D ALREADY HAVE ONE

YEARS AGO, APPLE INTRODUCED A cute little computer with a monochrome screen and not much memory. It attracted, along with devoted fans, many detractors who said it wasn't a "real" computer. Apple persevered and eventually came up with a version of the little computer that was to become a valuable business tool.

Apparently the folks in Cupertino aren't tired of this story—the tale of the Mac 128's metamorphosis into the Mac Plus—because they've done it again with their personal digital assistant. Where the MessagePad 100 got bad press as "the little PDA that couldn't," the 120 with Newton Operating System 2.0 does everything you could reasonably expect from a handheld computer. As someone who once demonstrated a MessagePad 100 to a college math class and had to endure shrieks of laughter when the little computer translated the handwritten word *function* as *bite me*, I'm genuinely impressed with the contrast between the old and new orders in Newtonia.

It Takes 2.0 to Tango

The MessagePad 100 with Newton 1.X software had two problems: its handwriting recognition was inadequate; and it was so slow at some common operations you'd start to think the MessagePad had locked up or crashed, only to see changes flicker across the screen a minute later.

The first problem was solved last year with the release of Graffiti, a character-recognition program from Palm Computing. And Newton's own character-recognition engine now reads handprinting with nearly 100 percent accuracy. If you must write in cursive, however, accuracy will suffer; you'll need to restrict yourself to a few hundred stock cursive expressions to bring accuracy up to a reasonable level. You can also leave the cursive form of challenging words as "ink" for later recognition if you're scribbling in a hurry. The bottom line is that character recognition no longer turns routine business correspondence into haiku.

For those who want faster input, Apple now sells a keyboard ($89) that's nearly the same size as the MessagePad itself. What's next—a 9-inch video-screen accessory that turns the MessagePad into a battery-powered CPU chip-carrier?

The speed improvement in 2.0 is amazing. Character recognition can be poky, but 2.0-adapted apps really fly (you'll probably need to update older software to avoid cosmetic screen-handling glitches or outright crashes). Holosoft's Equate and PelicanWare's QuickFigure Pro (see *Reviews*, October 1995) are as fast as real spreadsheets on a real Mac, and Intuit's Pocket Quicken, bundled with this model, is so snappy it's a pleasure to balance a checkbook. Newton 2.0's internal functions (searching for names, switching between built-in programs in the standard Newton menu, Datebook operations) are so fast you wonder what earlier versions were doing wrong.



GIBSON

Speed turns out to be the main improvement in 2.0. Although Apple has introduced some niceties, it hasn't remodeled the built-ins enough to justify a version-number jump from 1.3 to 2.0. Users report that the Notepad's new Stationery feature is the most useful tweak. The Stationery options (such as outlines and to-do lists) also benefit from the new Landscape (sideways) viewing mode, which displays line lengths that make the MessagePad feel more like a real communications device and less like a futuristic toy.

If you have a MessagePad 120 with Newton OS 1.3, you can (and should) upgrade to 2.0 for $109. If you have a 100 or 110, look into Apple's rebate program. Even if you've solved your character recognition problems with Graffiti, the improved speed alone justifies the expense of upgrading.

Out and About

The MessagePad 120 has a built-in interface to eWorld, Apple's online service; support for America Online and CompuServe is scheduled for early 1996. Some aspects of eWorld's future are a bit hazy, and it's definitely a minority service (about a tenth the size of America Online), but it has a better uptime score these days than its competitors and has done a better job of integrating World Wide Web access into the basic service.

Faxing, printing, and E-mail have been simplified somewhat; all of the 120's communications services use a single in/out box with its own text editor. I know a winery sales rep who calls her MessagePad 120 with 2.0 "the world's finest reimbursement generator"—she uses Quicken and E-mail to produce expense checks at the office while she's on the road. The 120 will no doubt win many hearts as a handheld, user-friendly accounting system.

The Last Word

The MessagePad 120 isn't destined to become landfill like a truckload of its unlucky predecessors. It won't amuse college students with its character-recognition errors, but it does support automatic filing (by fax or E-mail) of desktop-Quicken–ready expense reports. As a product for mobile professionals, Apple's target market, the MessagePad is a successful product that lives up to expectations. It's a job done late, but a job well done.—CHARLES SEITER

RATING: ★★★★/7.5 **PROS:** Great improvements in character recognition and speed; Pocket Quicken is a useful addition. **CONS:** Compatibility problems with apps written for earlier versions. **COMPANY:** Apple Computer (408/996-1010). **LIST PRICE:** $699.

Painter 4

NEAR-PERFECT PAINTING PROGRAM JUST GOT BETTER

FRACTAL DESIGN PAINTER IS ONE product that always seems to bring a smile to designers' faces. Few programs approach its level of sophistication and utility, and fewer still go about their tasks so competently.

Painter is packed with customizable tools that interact realistically with textured surfaces to produce authentic-looking painting effects: pencil marks build up as you apply them, watercolors are diluted with (digital) water, and oil brushes can carry more than one color.

Streamlined Interface

Continuing the interface-streamlining trend that began with version 3, Painter is down to six redesigned palettes. The general Tools menu has been replaced by palette-based menus that consolidate related functions. Menus also adorn the Objects and Art Materials palettes, making color-, texture-, and object-management functions more accessible.

The result of all these changes is a more logical, comprehensible painting environment. Still, I miss the tear-off brushes of Painter 2; although they were too big and cluttered up the workspace, I liked being able to use several brush variants simultaneously.

Floating Objects and Tiled Mosaics

Among Painter 4's new features are shapes—vector-based objects you can integrate with Painter's bitmapped images—and a mosaic brush that builds images using individually generated tiles.

The Shapes feature, derived from Fractal Design's Color Studio, lets you layer PostScript-based, Bézier-curved objects with Painter's bitmapped floating objects. Shapes reside in an object layer above the paint layer. You can import PostScript objects from illustration packages or build and edit shapes with Painter's drawing tools. You can also use Shape tools to specify bitmapped selections and build masks.

Shapes give Painter much of the functionality of illustration programs, but with Painter you can do things that are impossible with such packages. You can make shape objects transparent, for example, or seamlessly composite a shape with the underlying image. In addition, you can convert shapes into bitmapped floating objects and edit them with the program's painting tools and filters.

A new feature, Mosaic, lets you build images that simulate tile and stained-glass compositions. You specify the tiles' size and color and the amount of grout separating them, then simply paint as you would with any other brush. As you lay the tiles, they automatically size themselves according to their neighbors' positions. You can re-render images saved in Painter's native file format at any time.



Painting with Tiles Painter 4's Mosaic mode lets you paint with tiles that automatically carve themselves to fit in with their neighbors. You can start with a cloned photograph or blank canvas covered with grout.

When you exit Mosaic mode, you can paint over, or apply effects to, the tiles. You can't build or edit mosaics as floating objects, but you can copy and float finished mosaics and composite them with standard images. Painter 4 also lets you build tesselated mosaics from odd-shaped pieces. Complex tesselations require lots of memory and can take some time to render, even on Power Macs, but the results can be spectacular.

Painter 3 let you record painting instructions as Sessions, which you could then save and play back as movies showing how the image was created. Essentially, Painter built a short program—a script—that re-created the image. Painter 4 expands this capability. You use VCR-like controls to access scripts from the Objects palette: hit Record and every program instruction is saved. You can edit the scripts, step through them one instruction at a time, and record frequently used operations as painting macros using Painter's no-programming-required script-recording feature.

More Goodies

I don't have room here to discuss all of Painter 4's new and expanded features, so I'll limit myself to some of its more interesting, useful aspects. Net Painter lets artists collaborate on an image over a network. New rulers and guides with snap-to options help you position image elements. The Mask Edit mode now lets you apply paint and imaging effects to masks. A color-correction dialog box lets you adjust color values by manipulating curves on a graph. The Apply Surface Texture effect now provides a reflection-mapping option. You can define floating objects as clickable image maps and give them URLs for Web-page links. The Painter CD also comes with a large collection of goodies, including stock photos and custom brushes.

Painter isn't hard to use, but it has a long learning curve. Mastering it takes time and patience. Fortunately, Painter 4 includes built-in help, a new tutorial booklet with a dozen useful examples, and a well-organized, comprehensive 400-page manual that's spiral-bound, so it lies flat for easy reference.

The Last Word

Painter 4 is a wonderful program. Unsurpassed as a tool for natural-media painting, it's also a very competent image processor. The new Bézier shapes give you added flexibility and make Painter an even better partner for other graphics programs. Painter 4 deserves a place on the hard drive of any graphic-arts professional.—CARLOS DOMINGO MARTINEZ

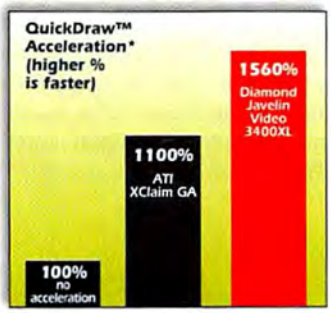
RATING: ★★★★★/9.4 **PROS:** Excellent natural-media emulation; cool mosaic brush; new Bézier shapes capability; easy script recording. **CONS:** Long learning curve. **COMPANY:** Fractal Design (408/688-5300). **LIST PRICE:** $549.





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*Based on QuickDraw acceleration tests using Ziff-Davis MacBench 2.0. Tests completed on a Power Mac 9500/120 with a resolution of 1024 x 768 at 16.7 million colors.

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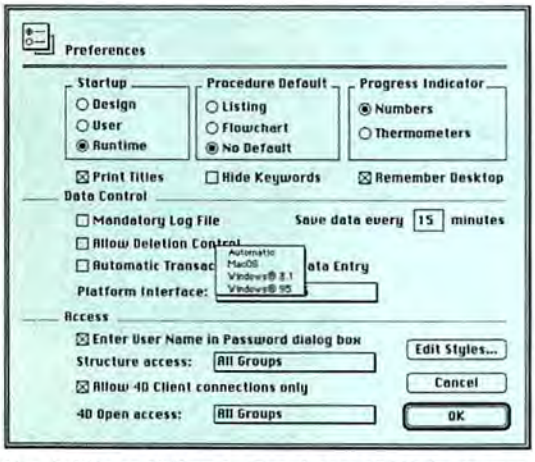
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4th Dimension 3.5

LEADING DATABASE GETS IMPORTANT IMPROVEMENTS

ACI US'S 4TH DIMENSION (4D) has a bit more than half the Macintosh relational database market in the United States and a near stranglehold on the European counterpart. The program has survived and beaten back a half-dozen serious competitors over the years—so successfully that ACI US's only hope of market expansion is on the other side of the fence, in the Windows domain.

So the latest version of 4D represents a shift of focus—to cross-platform development—and the solution to scores of nagging technical problems in database porting. Because the Windows-based systems don't have uniform Apple-defined display standards, for example, the 4D language now includes a Scale command to resize screens for optimum display resolution when an application is ported. You simply set the project's target platform in the Preferences dialog box (see "Now Arriving on Platform 3"). The 4D Transporter utility automatically handles the somewhat gooey details of file-structure conversion between Mac and Windows databases (Windows doesn't have the Mac data-fork/resource-fork file structure). Quick Reports that are defined on one side of the platform fence work without modification on the other side, and ACI US has written its own 4D command set for managing cross-platform picture compression—an issue on which there's not much agreement between Apple and Microsoft. Needless to say, 4D Server (purchased separately) has been rewritten to accept all this harmony and is available in a Windows version.



Now Arriving on Platform 3 Every feature of 4D's development environment has been adapted to accommodate cross-platform (Mac/Windows) database programming. A simple choice from the Preferences menu identifies the target platform.

Windows Touches

As you would expect, developers of popular 4D-based Mac apps for small-office accounting and management are already porting their programs to Windows. But 4D 3.5 has also attracted brand-new Windows developers. The Windows-side 4D newbies I talked to were uniformly impressed with its programming efficiency (you can create a nice-looking app with a modest amount of coding) and free-form relational-structure organization (you can modify structures and links on the fly in design mode, a rare feature in traditional Windows databases). These new developers also like the free, unlimited distribution of run-time versions of database applications, a real margin-enhancer for developers who sell a few hundred to a few thousand copies of a vertical-market application. The documentation must also come as a surprise to new developers; it's the best I've seen for a database.

4D has a few other Windows-friendly touches. Intel-based systems, for example, have been living with dBase and its derivatives for over a decade, so both Mac and Windows 4D now support the venerable .DBF file format (it's older than the Mac) for import and export. For that matter, import and export have been reorganized, and importing ASCII files is much faster. 4D was an early friend of Oracle and other SQL giants, and Windows-side APIs for large-database connectivity are now part of the ACI US catalog as well.

Improved Performance

ACI US has significantly optimized 4D 3.5 for PowerPC performance (and is one of the few nongraphics companies to tackle 604-specific optimization). However, 4D is still not quite as fast as the current version of Blyth's Omnis 7 at searching large data tables, and it's nowhere near as fast as Microsoft FoxPro at the same task.

Nonetheless, for most user interactions the speed of the interface itself is a key factor, and here 3.5, even on a plain Power Macintosh 6100, is absolutely snappy compared with 3.0 on a good Quadra; just click, and *pop*—something happens. 4D's highly evolved multitasking capabilities also mitigate the impact of its good-but-not-stellar search speed on productivity; in real life, searching and sorting giant flat files is a tiny fraction of day-to-day office database interaction.

Although 4D now covers the Power Mac and Windows platforms, it hasn't sacrificed its original virtues. You can do 4D 3.5 development, amazingly enough, on a Mac SE with 2MB of RAM, suggesting that bloatware need not be the inevitable price of progress (although 4D takes up 8MB under Windows 95). It's still easy to define and modify database structures and to design layouts for data entry and reports for output, and most aspects of the basic 4D scripting language have been stable for at least four years.

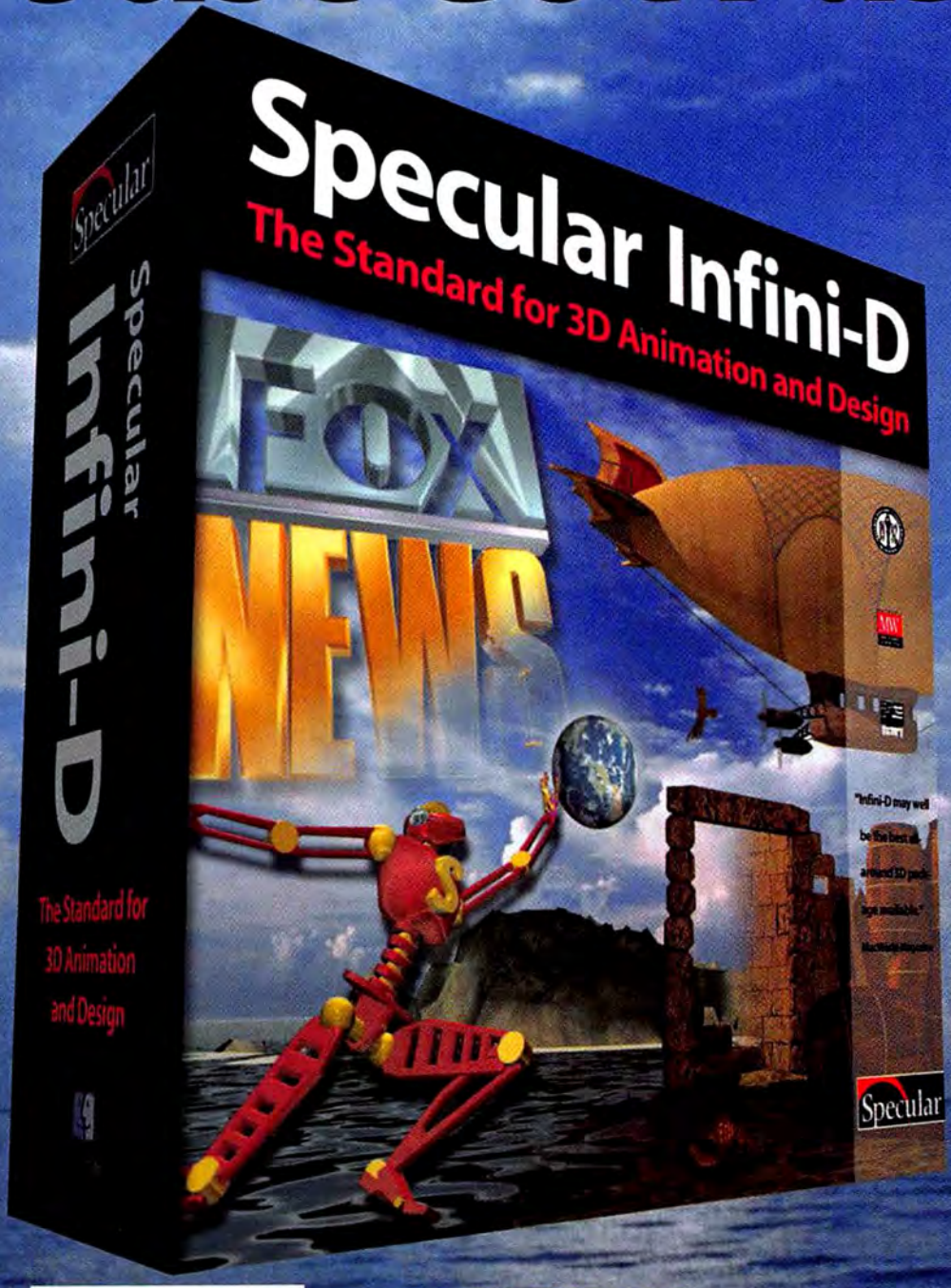
4D Compiler, another in the vast array of 4D-related products, not only provides security for database scripts but lets them run several orders of magnitude faster. ACI US seeks to minimize developer retraining by maintaining a core product that can be rewritten for new platforms and incorporating new features and new functions via its separate add-on products (4D Compiler, 4D Passport, and 4D Server). The evidence from the market shows that this approach keeps developers very happy indeed.

The Last Word

ACI US's 4D is the leading Mac relational database, and now you can use it for Windows development, too. It's a good choice for mixed-platform, medium-scale client/server applications.—CHARLES SEITER

RATING: ★★★★/8.8 **PROS:** Thoughtful portability enhancements; generous new run-time policy. **CONS:** Slower than FoxPro and Omnis at searching large databases. **COMPANY:** ACI US (408/252-4444). **LIST PRICE:** $895.

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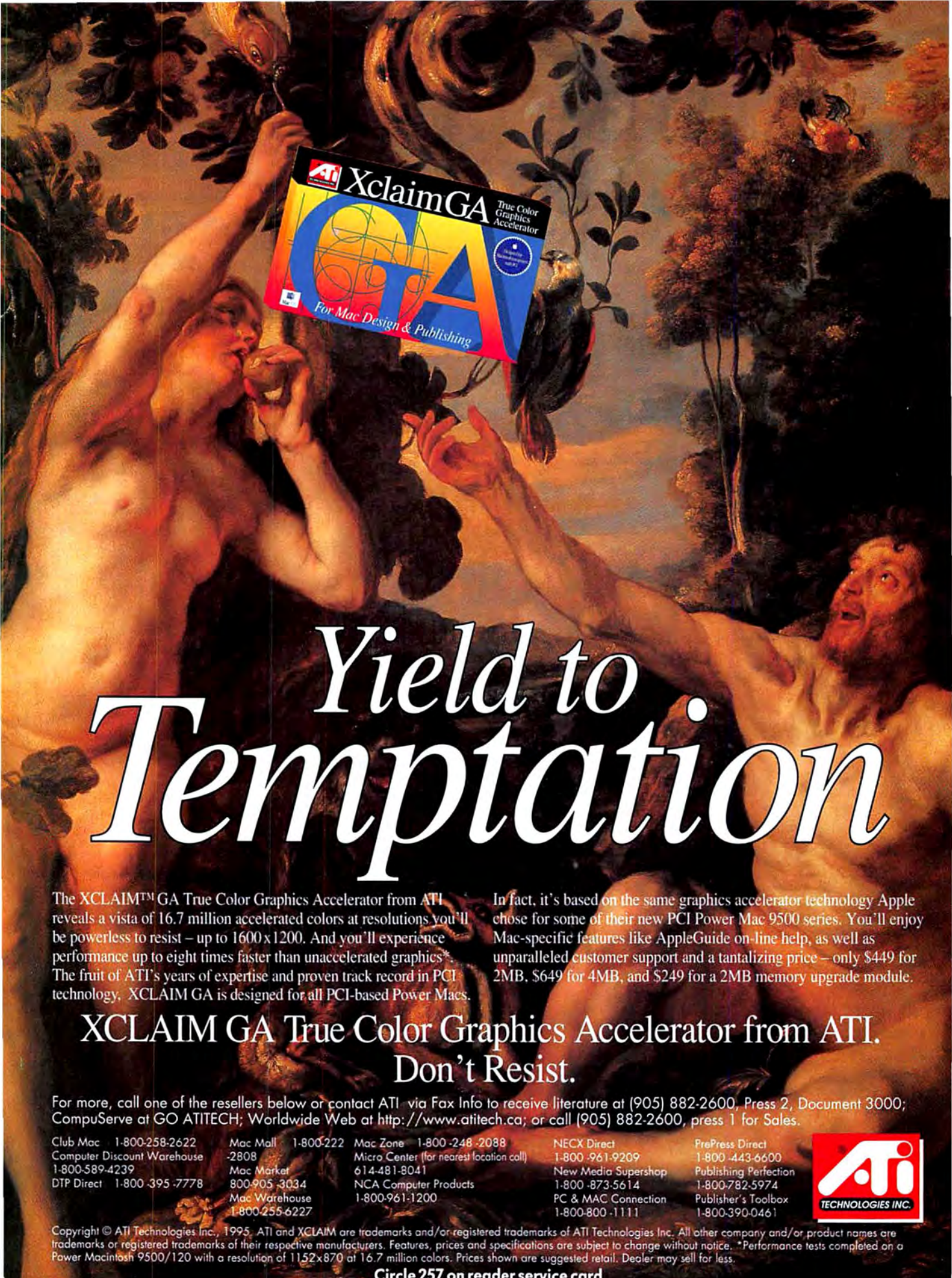
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Dabbler 2

AFFORDABLE NATURAL PAINTING

Want to draw with your Mac, but can't justify the expense of a professional-level paint program like Fractal Design's Painter? The same company's aptly named Dabbler 2 might be the answer. A 16-bit color program, Dabbler 2 provides much of Painter's natural-media-emulation environment at a fraction of the cost.

Dabbler 2 includes a flipbook feature, for creating simple 2-D animations, and provides built-in drawing lessons. The program now comes on CD-ROM with 120 paper textures, 300 stencils, 100 professional stock photographs, and 3 libraries of image fonts from Image Club.

Four Drawerfuls

Dabbler is organized around a simulation of an artist's drawing table, with four drawers holding drawing papers, tools, colors, and *xtras* (tool modifiers) arrayed across the top of the screen. The drawing area beneath these items represents one page of a sketchbook.

Click on a handle, and that drawer opens to reveal its contents. Icons on each drawer's face display your most recent selections, keeping frequently used tools and colors handy. The paper drawer's libraries give you access to more textures.

The colors drawer holds eight color-chip palettes, eight gradient palettes, and a color wheel for customizing them. You can paint using the colors of an underlying image, a process called cloning. For example, you can import a photo and recast it as an oil painting. Dabbler accepts standard plug-ins, including Acquire filters for directly scanning images.

Like Painter (also reviewed in this issue), Dabbler emulates natural media, so pencils and brushes interact realistically with the digital paper to which they're applied. Water blends colors, crayons leave a waxy trail, and felt markers bleed, all quite convincingly. Dabbler 2 offers five tool sizes, up from three in the previous version.

At first glance, this version of the program appears to have fewer tools. That's because Dabbler 2's image-processing functions (sharpen, soften, motion blur, glass distortion, and so on) have moved from the tool drawer to an expanded Effects menu. Similarly, the Sketchbook-Browse/Edit, Type Styles, Sound, and Sessions Recorder functions have been transformed into menu commands.

These changes improve Dabbler's interface. Accessing these functions from the menu saves you from opening drawers frequently to retrieve tools you've put away. You can also now browse the current sketchbook, as well as invoke the program's tracing-paper and image-cloning modes, by using buttons on the face of the drawer cabinet—a great improvement. However, to edit the current sketchbook, you must use the menu command—a ⌘-*key* sequence here would be a nice addition.



Dabbling in Cartoons Two Tutors that can help you learn basic cartooning techniques.

Dabbler's teaching methods are also improved. Dabbler 2 replaces version 1's simple recorded sessions with Tutors, QuickTime-driven, interactive lessons that play on floating windows above your drawing page. You can interrupt the lesson at any time and try the techniques on the drawing page, right next to the Tutor.

Tutors are based on Walter Foster Publishing's learn-how-to-draw books—*Cartooning with Bruce Blitz* (of the PBS series) and *Cartoon Animation* by Preston Blair, the famous Disney Studio animator. Unfortunately, the two lessons in Dabbler 1, taken from Walter Foster's *How to Draw* volumes 1 and 2, offered more-basic drawing lessons for beginners, and these are gone. Nonetheless, both new Tutors are excellent and entertaining.

A Tutor also supplants a printed manual. In truth, Dabbler is so easy to learn that there's not much to document. Overall, the Tutor-based manual and tutorials are fine, but they obscure drawers and dialog boxes while you're learning. Call me old-fashioned, but I found Dabbler 1's printed reference (a mere 18 copiously illustrated pages) more useful.

Dabbler 2 stores images in user-defined multipage sketchbooks. These offer a convenient way to organize projects, and Dabbler automatically saves their contents when you close them.

Generally speaking, autosaving is a good idea, but this implementation makes it very easy to damage an image. For example, if you apply a global effect, say glass distortion, and inadvertently touch the tablet with your stylus, you can no longer undo the effect—like it or not, it's now part of the sketchpad image. There is a Revert command, but it takes you back to the start of the session, so you lose intervening changes you *do* want to retain. Of course, you can save images as separate files (doing a Save As every time) or continually copy images to new pages, but that's a pain.

Dabbler 2 uses the linked-page structure of sketchbooks to produce flipbook animations. Flipbooks are limited to 100 pages in length, and their images, to 320 by 320 pixels in size, but building them is wonderfully simple. You can have as many as 3 pages transparent, letting you easily fine-tune image movements. VCR-style controls let you flip pages as you draw and run the finished animation. You can export flipbooks as QuickTime or Video for Windows files and print them to produce physical flipbooks—even Nintendo-jaded kids will love them.

The Last Word

Budding artists and novice computer users will find Dabbler 2 an easy and affordable way to paint on the Mac. It's perfect for home use or light professional applications. And if you're among the artistically challenged, its built-in, interactive lessons might even help you learn to draw.—CARLOS DOMINGO MARTINEZ

RATING: ★★★★/7.5 **PROS:** Easy-to-use, affordable natural-media paint tools; flipbook animation. **CONS:** Automatic saving makes it easy to damage images inadvertently. **COMPANY:** Fractal Design (408/688-5300). **LIST PRICE:** $69.

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Great idea. After all, memory upgrades can be a very costly addition to your system. And with the demands new software is placing on your Mac these days, virtually everyone who uses a Mac eventually buys more memory. One little detail is often overlooked. Many companies sell memory upgrades manufactured with DRAM that does not meet the correct industry standard voltage range for your system. The resulting voltage loss can cause you to lose valuable data. Sub-spec memory runs too slow to match the speed of newer, faster processors, causing timing errors that can corrupt your hard drive and even leave your system inoperable. So cheaper memory might cost less in the short run, but you get burned in the end. To avoid these problems check your system's manual for correct refresh rates, speed and voltage specs, and make sure you install memory that matches it. Or, easier yet, just buy Viking Components memory. It's the best.



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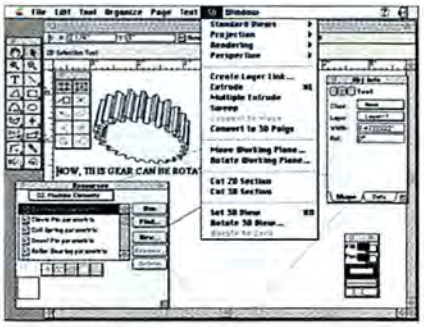
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MiniCad 6

NOTHING'S SMALL ABOUT THIS MODULAR PACKAGE

AFTER A TEN-YEAR STRUGGLE against a dozen larger, better-funded rivals, MiniCad has become the best-selling CAD package for the Macintosh. Graphsoft attained this success through a nearly fanatical devotion to customer requests.

Looking at the expansion of MiniCad from a slim 800K application to a 32MB behemoth, it seems as though every suggestion that came through the customer-support hotline in the past decade prompted at least one new feature. To Graphsoft's credit, each successive version of MiniCad managed this rapid growth intelligently. One of MiniCad's strengths, in fact, is that the right tool for any task is usually easy to find.



All Geared Up MiniCad 6's new, complete 3-D menu, combined with its Object Info palette, make generating and modifying precision 3-D parts simple.

An Eye for Design

In version 6, MiniCad does something CAD programs should have done from the start: it organizes tool kits by discipline, with drawing tools—not just clip art—arranged in industry-specific sets. Since it's rare to ask an engineer who spent the morning designing printed circuit boards to draft a plumbing plan for an apartment building in the afternoon, this new component structure makes good sense. It amplifies MiniCad's traditional strength in organization.

The tool kits in version 6 cover general design; architecture/engineering/contracting (AEC); and mechanical, civil, and electrical engineering. Each tool kit—carefully described in a substantial new manual—provides special overlays that transform the generic MiniCad tool palette into a specialist's interface, complete with icons, symbols, worksheets, patterns, and object formats appropriate to each discipline. Macro programs in MiniCad's internal MiniPascal language are now conveniently stored in lists near the objects on which they operate.

The Graphsoft-supplied resources in each tool kit are varied and rich, and if by some chance the perfect tool or component is missing, you can add your own. Even without do-it-yourself components, it's simple to create complex projects quickly.

Using only canned materials from the AEC tool kit, you can design a house in a few hours, right down to the brick walkway leading to French doors on the patio. The mechanical-engineering tool kit contains drawerfuls of odd pins, clips, and connectors, not just the basics; and the general-design tool kit contains resources for space planning, restaurant design, landscaping, and even theatrical lighting—8MB of tools in all.

The tool kits' Resource palettes offer an astounding level of detail. They list most of the standard components of each discipline, but the items visible at first glance are only the beginning. Double-clicking on each item reveals an additional layer of folders, full of design components, worksheets with detailed bills of materials, and helpful specialty drawing tools. Under *booths*, for example, you'll find a range of restaurant seating, from comfortable, posh dining-room banquettes to intentionally uncomfortable fast-food setups.

You can transfer worksheets to and from Microsoft Excel more cleanly than in previous versions. These worksheets hold inventories—and frequently prices and dimensions as well—of the components required for complex objects. They're now more conveniently accessed in the new resource lists, too.

If earlier versions of MiniCad had a crucial weakness, it was their limited 3-D capabilities, compared with those of competing products. The new 3-D menu offers a complete range of tools, and you can define up to 256 custom working planes for editing 3-D objects (see "All Geared Up"). You can create 3-D objects through simple menu commands, and precisely size them by typing attribute dimensions in the Object Info palette.

There are a number of other useful improvements. Updating of large drawings is practically instantaneous—a vast improvement over MiniCad 5's speed. MiniCad can now perform terrain modeling with its digital terrain-modeling tool kit. ClarisCAD refugees will delight in MiniCad's accurate direct import of their ClarisCAD files; there's no need to mess with .DXF format files.

Passé Pascal?

MiniCad's MiniPascal programming language is one of the few significant pitfalls. Although Graphsoft has extended the language by inventing a large library of useful procedures, fewer and fewer newcomers are familiar with Pascal syntax, and an English-like scripting or macro language would be a welcome addition. Still, you can accomplish a fair amount with MiniPascal using just a few statements. You can also run MiniPascal macros from AppleScript, a useful feature for automating the routine aspects of drafting and other CAD-related tasks.

MiniCad 6 has its share of bugs. Minor quality-control glitches include misspellings, mislabeling of resources, and slightly more serious interface bloopers. When I used the cross-stitch overlay, for example, a bit of drawing overwrote the resource palette itself, and I could actually move the drawing fragment around with the palette.

The Last Word

MiniCad earned its top seat in the Macintosh CAD marketplace by showing endless devotion to user needs. Version 6 offers a huge expansion in prefabricated-component convenience, supplemented with a well-thought-out presentation format for its myriad new elements.

—CHARLES SEITER

RATING: ★★★★/8.1 **PROS:** Great tool kits; superior speed; much improved 3-D capabilities. **CONS:** MiniPascal programming system needs an overhaul; minor interface glitches. **COMPANY:** Graphsoft (410/290-5114, *marketing@graphsoft.com*). **LIST PRICE:** $795.



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AppleTalk for Windows 95

APPLETALK WORKS ONCE AGAIN UNDER WINDOWS

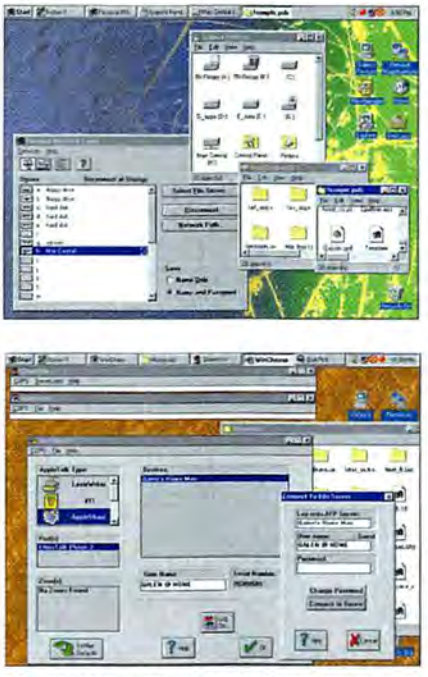
YOU'VE UPDATED YOUR PCS TO run Windows 95, and now you need your PCs and Macs to talk over an AppleTalk network. Easier said than done. The scant solutions are, as their creators admit, just first steps. Both Personal MacLAN Connect 5.51, from Miramar, and COPSTalk for Windows 1.2f, from CoOperative Printing Solutions (COPS), are merely *compatible* with Windows 95 (both also work with Windows 3.1; in addition, MacLAN supports NT). But that's all.

Strange Names

Neither program gives you access to Windows 95–specific capabilities, such as long file names. That means Windows 95 views your long Mac file names the way previous Windows versions did: as if they were DOS names, so you get names like !PERSONA.LD1 instead of Personal Data when viewing or opening Mac files from Windows 95. If you save files with these weird names, you don't overwrite the actual long names—a tilde (~) before the file extension indicates a secondary name that Windows 95 keeps for compatibility with older programs, and an exclamation mark (!) at the beginning of a file name is MacLAN's and COPSTalk's way of doing the same for Mac files accessed by a PC. Basically, these are aliases. MacLAN also lets a Mac see PC files, and the same short-name issue arises there as well: your Mac sees PC file names like person~1.doc instead of the Mac-like (and Windows 95–like) Personal Data.

MacLAN, a hybrid of Windows 3.1 and Windows 95 code, works with Windows 95's Network control panel and with networked printers. But COPSTalk, a DOS-level network driver that can communicate with Windows network-management software, can't deal with Windows 95's networking architecture—in fact, Windows 95 will disable COPSTalk as an unsupported network any time you use the Network control panel. Installing COPSTalk requires extensive fiddling with low-level DOS files—you need to be a DOS expert to succeed.

Both companies say they will make their programs true Windows 95 programs, supporting not only long file names, but also the Windows Network Neighborhood (sort of like a desktop for networked resources) and the native Windows 95 network engine. Miramar plans to release an upgrade in the second quarter (not yet priced), and COPS will offer a $29.95 upgrade this spring.



A Limited View Personal MacLAN Connect (top) and COPSTalk (bottom) let Windows PCs see Mac drives and files, but both programs are limited to the old DOS-style names. MacLAN also lets Macs see PC drives and files.

The Good News

Both programs do the AppleTalk part well. With either program's client components running, your PC acts like a networked Mac, even using a Chooser-like facility to work with printers and systems. From Windows 95, the Macs appear as standard PC network volumes from the Explorer, File Manager, and any program's Open and Save dialog boxes.

MacLAN Connect goes a step further: it can make your PC an AppleTalk server, so your Mac can see and use its disks, files, and printers—although to use non-PostScript printers, you need drivers such as the PowerPrint ones from GDT SoftWorks ($149; 604/291-9121, *sales@gdt.com*).

Both programs let you have users and groups with different levels of permission—exactly the same as the Mac's Sharing Setup control panel.

I prefer MacLAN because setup is easier, the interface is cleaner, it works as both client and server, and its interoperability with Windows 95 is better. But COPSTalk has much more extensive network-printer controls.

Considering that Personal MacLAN Connect lists at $199 per user (and upgrades are $99), you're paying a hefty fee for just basic compatibility. At $179 per user list, COPSTalk may be slightly cheaper, but it won't let a PC be a server and is much more of a headache to manage. (However, if you're a Farallon PhoneNet user, you can get COPSTalk for $89.95 from Farallon [510/814-5000, *info@farallon.com*].)

The Last Word

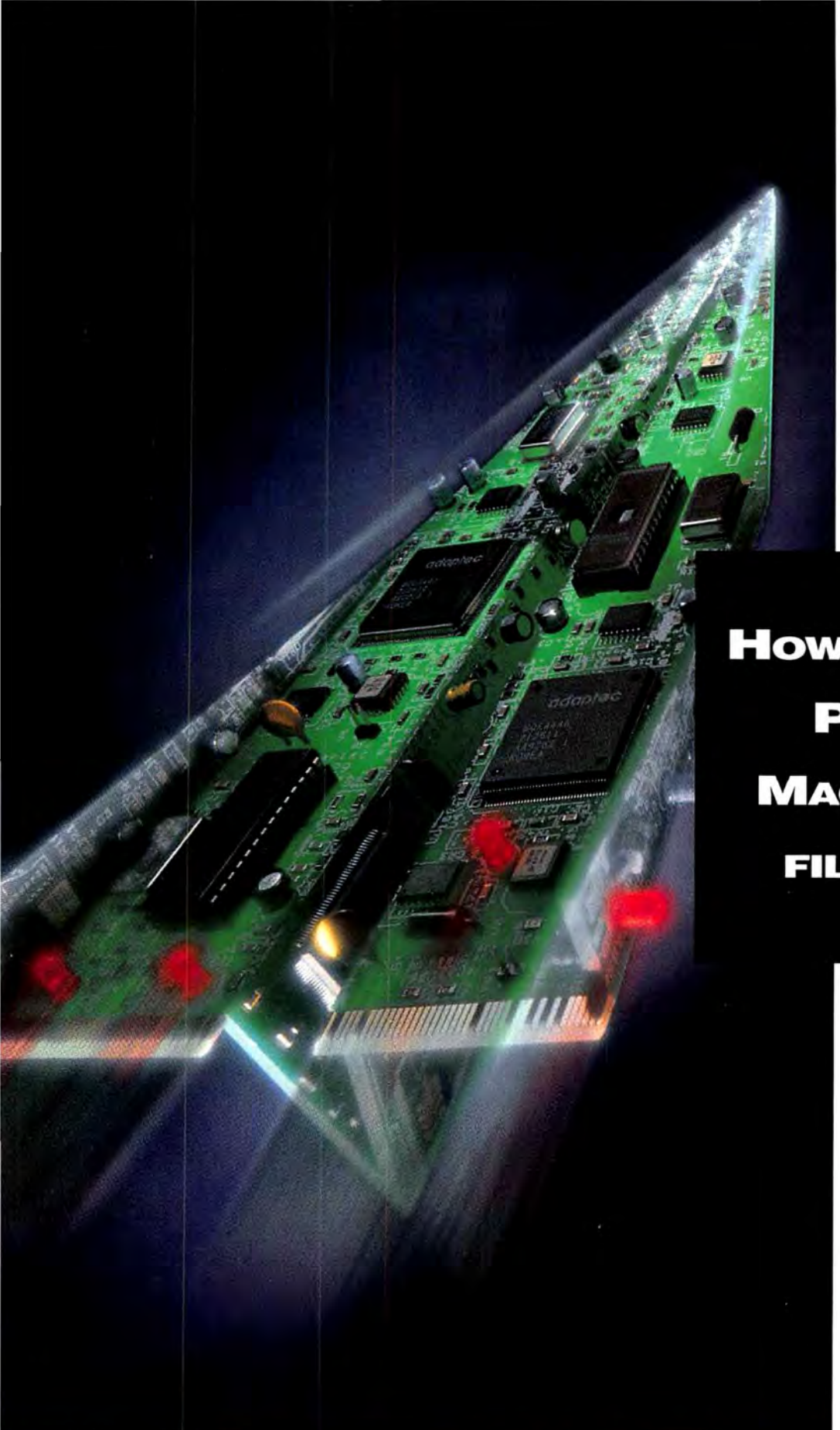
I've always been a fan of Personal MacLAN Connect, and it's become the primary option for peer-to-peer cross-platform networks. COPSTalk does the job, but I'd wait until the full Windows 95 version before taking it seriously. For now, both programs are clearly delivering less than users need.—GALEN GRUMAN

COPSTalk for Windows 1.2f

RATING: ★★/4.6 **PROS:** Gives PCs running Windows 3.1 and 95 access over AppleTalk to Mac files and printers. **CONS:** Doesn't support Mac or Windows 95 long file names; is not a native Windows 95 program; operates only as a client; is very difficult to install. **COMPANY:** CoOperative Printing Solutions (770/840-0810, *sales@copstalk.com*). **LIST PRICE:** $179 per user.

Personal MacLAN Connect 5.51

RATING: ★★★/5.8 **PROS:** Gives PCs running Windows 3.1, 95, and NT the same easy AppleTalk file-sharing capabilities that Macs have; lets PCs be servers and clients. **CONS:** Does not support Mac or Windows 95 long file names; is not a native Windows 95 program. **COMPANY:** Miramar Systems (805/966-2432, *sales@miramarsys.com*). **LIST PRICE:** $199 per user.





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Circle 58 on reader service card

CodeWarrior Gold 7

KEY POWER MAC COMPILER GETS YET ANOTHER FACE-LIFT

DESPITE CODEWARRIOR'S POSITION as the premier programming tool for the Macintosh, this is the first time *Macworld* has reviewed it; Metrowerks produces new compiler versions faster than we can print the magazine. In keeping with this trend, CodeWarrior 8 will have shipped by the time you read this review.

But don't judge CodeWarrior's importance by its lack of coverage here. In early 1994, Power Mac developers called it "the compiler that saved Apple" because CodeWarrior let them get products to market in time for the first wave of 601-based Power PCs. The availability of key software packages at first launch was important in persuading hesitant consumers that a new incarnation of the Mac was viable.



Basic C CodeWarrior's menus and tool bar contain just the essentials. This simple interface efficiently creates projects and manages Metrowerks' rapidly growing family of compilers.

The Package

The CodeWarrior Gold 7 package contains a complete suite of tools. The full installation, with class libraries and documentation, takes a whopping 250MB of hard drive space, but a minimal installation can fit into 12MB. A companion product, CodeWarrior Bronze, offers a $99 680X0-only development environment.

CodeWarrior Gold 7 includes C/C++ compilers for 680X0 Macs and Power Macs as well as support for a generation of Windows 95 X86 and Windows NT X86 binaries, including compilers and Microsoft Foundation Classes. CodeWarrior also includes Object Pascal and extensive support for converting older Think Pascal code, an important part of the Mac programming scene. The complete development kit supports General Magic's Magic Cap, a futuristic language for personal digital assistants from Sony and Motorola.

All languages run under the CodeWarrior integrated development environment (IDE), or in a Macintosh Programmer's Workshop (MPW) shell. For quick-starting projects, CodeWarrior comes with both the MacApp and MacApp2PPC application frameworks and Metrowerks' own PowerPlant, a mixed skeleton-application/class-library package. Metrowerks also provides its own debugger, a profiler, and a memory-analysis tool called ZoneRanger.

Comparative Linguistics

Currently, Metrowerks and Symantec are the key competitors in the Mac compiler market. In comparing CodeWarrior Gold 7 directly with Symantec C++ 8.4, three main issues stand out: environment, performance, and support.

Symantec has a better editor and a more refined class browser, but CodeWarrior's more austere IDE (see "Basic C") offers a quicker Project-menu modify/recompile cycle—the heart of real software development.

In a mixed collection of benchmarks, Symantec's own compiler produces marginally slower code than CodeWarrior's, but the Symantec package also bundles Apple's MrC compiler, which produces 601-optimized code 2 to 25 percent faster than CodeWarrior, depending on the test. Metrowerks is working diligently to amend this situation in the next CodeWarrior revision.

CodeWarrior's PowerPlant projects also have an advantage in compiled code size over Symantec MacApp/Think Class Library projects; PowerPlant tends to add less extraneous library code into the final version of an application.

In the realm of support, Metrowerks is the quintessential favorite of developers. The debugger in CodeWarrior 7, for example, contained a few bugs that were quickly reported by users and just as quickly fixed. Symantec's support is professional and helpful, but Symantec is simply too large an organization—with too many other important revenue-producing products—to turn around a code fix in a day or two, a feat that Metrowerks accomplishes routinely. As a company, Metrowerks acts as though it understands that it lives or dies according to its esteem with Mac developers.

And Then There Were 8 . . . and 9

Metrowerks has targeted two goals for future revisions of CodeWarrior: perking up performance on compiler test suites and adding new language features. Early beta versions of CodeWarrior 8 (due for release in January 1996) show a 15 to 20 percent improvement in fixed-point arithmetic and bit/string operations, and near doubling of speed in complex branching operations through optimized simplification. CodeWarrior's current floating-point speed leaves little room for performance improvement. CodeWarrior 8 will also feature an integrated class browser, a longtime Symantec-exclusive feature.

CodeWarrior 9, due in April 1996, will reap the benefits of Metrowerks' agreement with Sun Microsystems. The new version will integrate Macintosh C with Sun's Java Web language—a specialized C dialect adapted for Web display tasks and applet (small downloadable application) development.

Like the inclusion of a Magic Cap development system, CodeWarrior's slated Java capabilities indicate Metrowerks' willingness to support the latest trends. Development tools for the BeBox are also reportedly in the works.

The Last Word

The CodeWarrior suite is a wildly popular development system for the Mac, with good reason. It has few faults, many virtues, and a vendor devoted to making developers happy.—CHARLES SEITER

RATING: ★★★★/8.4 **PROS:** Excellent environment and compilers for C/C++ and Object Pascal; rapid project throughput. **CONS:** Waiting for a few features, including class browser and editor amenities. **COMPANY:** Metrowerks (512/305-0400, *info@metrowerks.com*). **LIST PRICE:** $399.

Pivot 1700

A NEW PIVOTING MONITOR

MW LAB RADIUS WAS THE FIRST COMpany to introduce a monitor that gave you the ability to switch from portrait to landscape mode automatically just by rotating the monitor. Unfortunately, it was only a 14-inch monitor and had a fixed resolution in both modes. Portrait Display Labs is now shipping an updated version of Radius's discontinued Pivot monitor. Portrait Display's Pivot 1700 also rotates, but the 17-inch monitor offers a choice of three resolutions in both landscape and portrait mode. Unlike the original Pivot, however, the 1700 requires that you use a ⌘-*key* combination after you rotate the screen to tell the monitor that you've switched modes.

First and foremost, the Pivot 1700 can be used with a Macintosh or a PC. The monitor ships with a standard 15-pin VGA connector that plugs directly into a PC's video card but not the Mac's. Fortunately, a Macintosh adapter ships with the monitor. The display is a 17-inch multisynchronous Hitachi tube with a 0.26mm dot pitch yielding crisp, clean text, and is capable of resolutions of 640 by 480, 832 by 624, and 1024 by 768 in landscape mode, and transposed resolutions (480 by 640, 624 by 832, and 768 by 1024) in portrait mode. The 1700 is also fully Energy Star– and MPR II–compliant.

After installing the MacPortrait driver in the System Folder, restart your computer and select the resolution in the Monitors control panel. I was anxious to see my desktop in portrait mode, so I rotated the monitor. Nothing happened. Having used the original Pivot, which switched viewing modes automatically, I restarted the Mac and repeated the process. Still nothing. I broke down and read the manual, where it clearly states to hit ⌘-shift-R (or a user-definable key combination). Maybe it's just me, but for almost $1100, I expect the monitor to sense that I've rotated it and select the appropriate orientation automatically.

It was now time to play with the many control buttons on the face of the display. And I do mean many—my 11-year-old niece said that the monitor had teeth. Everything—from brightness and contrast, to keystoning and pincushioning, to RGB color adjustments—was right there. Many of the settings need no fine-tuning, but you can make any adjustment in a straightforward and simple fashion. I did find, however, that I needed to use the Degauss button every time I switched viewing modes. The bottom-right corner was always a bit darker than the rest of the monitor after a rotation. I also saw the monitor at a local store and it had the same problem. Text was sharp and clear with only a little fuzziness in the corners, while images looked fine.

The monitor's case color blended well with my Mac and surroundings—well, except for the strips of chromed plastic at the end of the rail where the display



SCOTT PETERSON

rotates. I left the monitor in both portrait and landscape modes for a few weeks, and the first thing everyone noticed was the chrome strips.

The Last Word

The Pivot 1700, at its current price, offers good image quality but lacks one important feature of a pivoting monitor—the ability to automatically switch views when rotated. Also, although it's only a minor annoyance, you really should not have to degauss the monitor each time you switch modes. On the plus side, the quality of text and images is great.—DANNY LEE

RATING: ★★★/6.6 **PROS:** Provides portrait and landscape views. **CONS:** Requires a key command to rotate views; monitor needs degaussing after rotation. **COMPANY:** Portrait Display Labs (510/227-2700, *jmjpdl@cerfnet.com*). **LIST PRICE:** $1099.

PageNow 1.5

ALPHANUMERIC PAGING SOFTWARE GETS THE MESSAGE ACROSS

PAGENOW PERSONAL EDITION 1.5 delivers a multitude of message types—E-mail, stock quotes, calendar reminders, database records, network-status or power-failure alerts, voice-mail and fax notifications—to your alphanumeric pager through a clean, easy-to-use interface, assisted by AppleScript and Apple events.

PageNow has a concise, well-written (and indexed) user's guide and a hefty solutions guide that describes preconfigured interface tools for functions such as equipment monitoring, online information gathering, and E-mail forwarding. (PageNow successfully forwarded mail from Qualcomm's Eudora, America Online, Claris Emailer, CompuServe, and PowerTalk.)

Installation is quick and easy: run the installer, configure your modem (minimum 2400 bps), and enter the pager ID for each pager. PageNow has preloaded configurations for more than 300 modems, as well as the paging telephone numbers for national paging services.

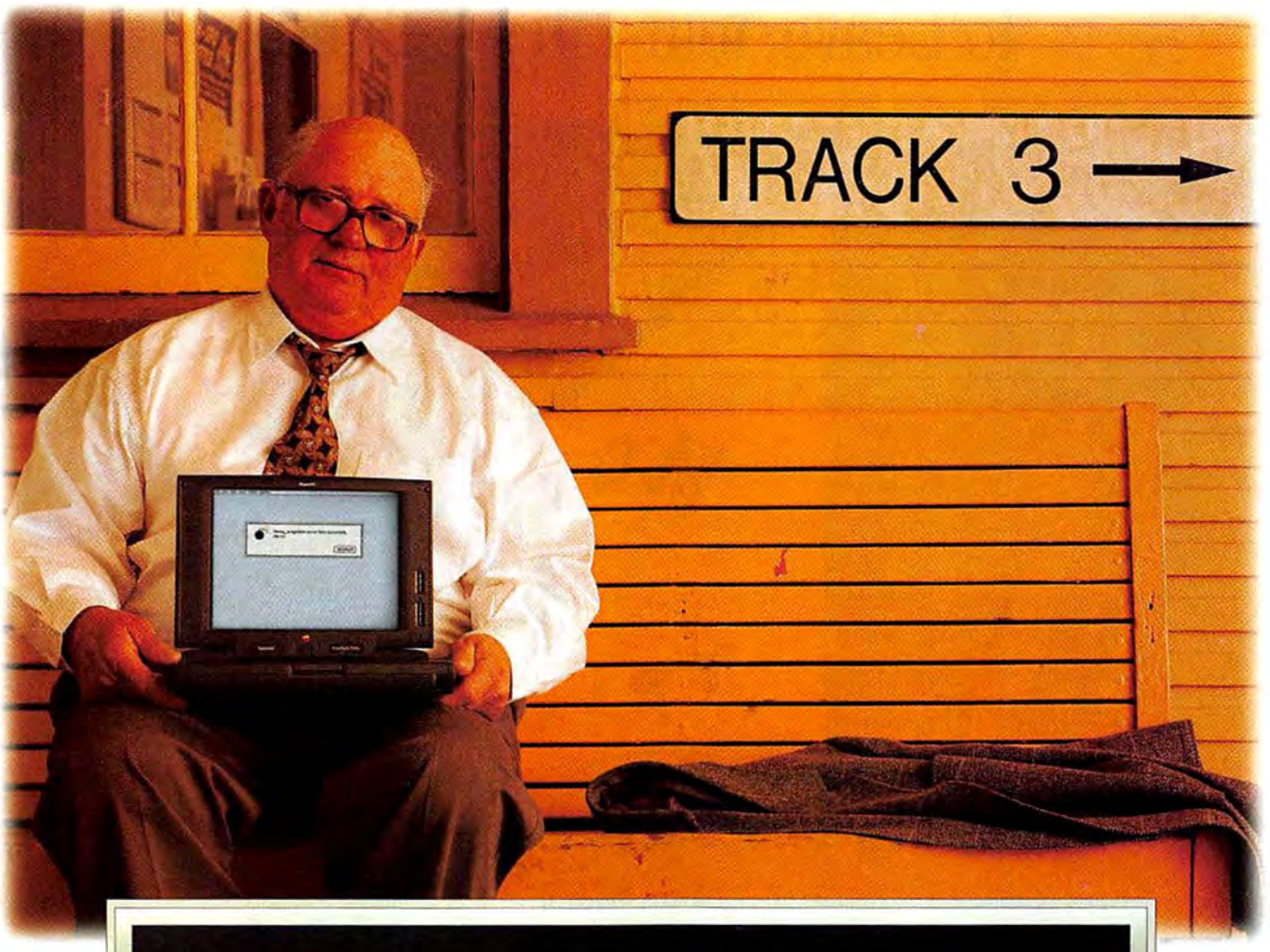
To send a message, you compose it in PageNow's pop-up window, select one or more recipients, and click on Send. The software queues messages and can broadcast to several people simultaneously.

A preview mode now shows how a message will look on three popular pagers—Motorola's Advisor and Memo Express, and NEC's Provider—right down to message scrolling, display fonts, and button operation. Other enhanced features include the ability to view the contents of messages you've sent; the ability to send or forward messages from the message queue; and an activity log that records the message contents, destination, and status. Now you can also set up automatic message headers and trailers—called greetings and signatures—that help recipients more easily identify the sender. A new Page At option lets you schedule pages for automatic delayed delivery.

Mark/Space has refined the user interface unobtrusively, preserving its simplicity. For example, you can now use keyboard shortcuts to quickly send repetitive pages, such as "Call the office;" and multiple pages to the same paging service

continues

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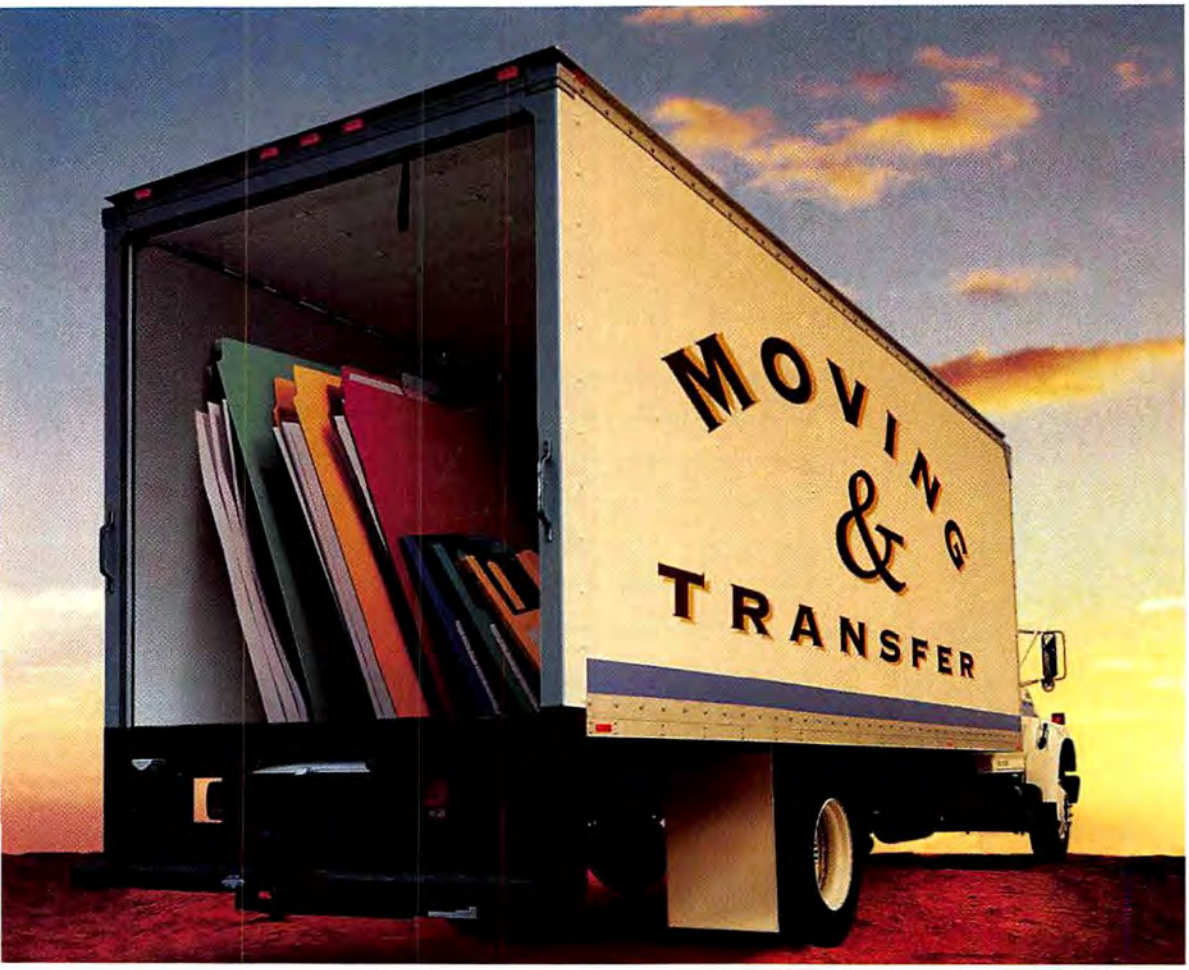
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go out as a single batch. You can set a delay time for paging retries, and the software alerts you if messages are not sent.

The key to PageNow's prodigious ability to interface with other software is a well-defined suite of Apple events for paging, which developers use to build paging capability into their products. It supports paging at a specified time; importing service, subscriber, and stock messages; and exporting status information.

PageNow also uses AppleScripts extensively; for example, preconfigured AppleScripts monitor the incoming-message folder to extract and summarize new messages for pager delivery. Some of these scripts require you to edit them—to set the destination paging address or other parameters. Notification scripts for E-mail, voice mail, and fax worked well when I tested them, as long as they were configured correctly and precisely—a minor typo when modifying a script can send the script into a tizzy, often with puzzling symptoms. I think a saf-



Pager Emulation The preview mode shows how a message will appear on three popular pagers.

er approach would have been for Mark/Space to supply scripts that access separate configuration information stored in a file local to the scripts.

The Last Word

Already an exceptionally good product, in its newest version PageNow enhances its paging applications while keeping its streamlined interface.—MEL BECKMAN

RATING: ★★★★/8.8 **PROS:** Voice-mail and fax notification; E-mail forwarding; Apple events and AppleScript support; lots of preconfigured solutions. **CONS:** Some scripts require manual editing. **COMPANY:** Mark/Space Softworks (408/293-7299, *mspace@netcom.com*). **LIST PRICE:** $119.

Astound 2.0

PRESENTATION GRAPHICS WITH A MULTIMEDIA TWIST

ASTOUND HAS ALWAYS BEEN among the best presentation tools, allowing you to create sophisticated multimedia presentations without grappling with complex scripts. Version 2.0 lets you build presentations with a higher level of interactivity, more animation, and better sound and graphics.

Astound presentations consist of any combination of text, graphics, QuickTime movies, and sounds—including a broad range of importable graphics and sound formats. Each text block, picture, or movie can appear or vanish using one of 30 transitional effects, including dissolve, reveal, and fade. Slides can also contain buttons that play sounds or movies, or allow you to jump between slides, open other presentations, or launch other programs.

In version 2.0, you can add objects that have self-contained animations—called Actors—to spice up business presentations. The program comes with 19 ready-to-use Actors, and animations created in other applications can also serve as Actors. Like all elements, Actors can enter and exit slides using transitions and path animations.

To ease integration of these elements, Astound has added a floating tool palette that offers quick access to options previously available only through menu commands. You can click on palette icons for transition and path-animation dialog boxes, and you can set attributes for objects and text blocks using pop-up menus.

Unfortunately, although this palette is generally convenient, it sometimes failed to display the correct name and point size of the font selected. It's also ugly. Font names and point sizes are displayed in Monaco and the default font for text objects is permanently set to Chicago.

Astound's new version offers improved drawing tools, including a texture generator for custom backgrounds. The Extrude command turns shapes into 3-D objects with custom-defined perspective, angle, light source, and depth.

Astound's new Tween command creates animated, morphlike transitions. Select two objects as starting and ending points, and Astound instantly creates a fluid animated sequence showing the first object melting into the second.

Astound's audio features have grown, too. For the first time, you can add sounds that play continuously across multiple slides for a background soundtrack.

Even with these changes, much about Astound has stayed the same in this upgrade. The set of transitional effects for individual objects is virtually unchanged, the number of transitions available to move between slides hasn't grown, and path-animation features haven't improved. It would have been nice to see some better animation features and transitions, but even without them, the



Astounding Features Astound's interface includes an 18-button floating palette for setting object attributes and assigning path animations and transitions.

upgrade is more than worthwhile.

Aside from the flaky floating palette, the only other noteworthy problem with Astound was its failure to import some TIFF files correctly. Converting the files to PICT format—as suggested in the documentation—took care of the problem.

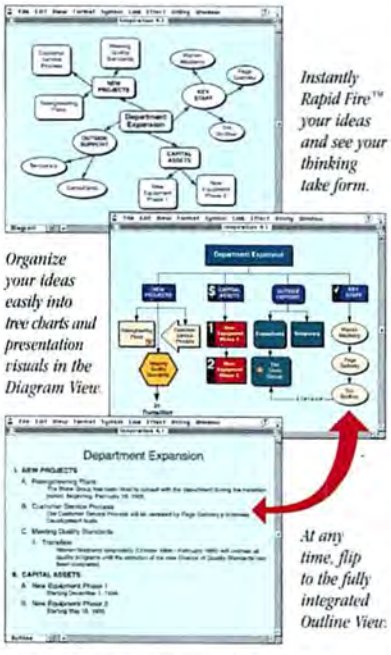
The Last Word

Astound 2.0's features are so innovative that it's possible to overlook its interface problems. Astound doesn't really even fit comfortably in the same category as PowerPoint or Persuasion; it's a full-fledged multimedia-authoring tool that makes simple work of producing memorable presentations.—JOSEPH SCHORR

RATING: ★★★★/7.1 **PROS:** Intuitive interface; continuous sound across multiple slides; improved drawing tools; outstanding interactive buttons. **CONS:** Limited path animation; quirky font palette; problems rendering imported TIFF files. **COMPANY:** Gold Disk (408/982-0200, *sales@golddisk.com*). **LIST PRICE:** $249.

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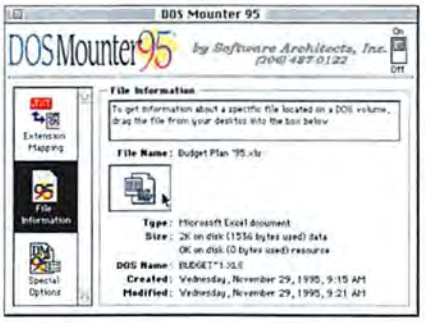
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DOS Mounter 95

WINDOWS-TO-MAC FILE-TRANSFER UTILITY GETS WIN 95–SAVVY

EVEN THOUGH WINDOWS 95 ISN'T selling as well as expected—and few applications take advantage of its capabilities yet—chances are somebody in your company is already creating Win 95 files that you'll need to access on your Macintosh. When that need arises, you'll want a copy of Software Architects' DOS Mounter 95, an upgrade to the well-known DOS Mounter 5.0 file-transfer utility.

DOS Mounter 95 lets you mount Windows 95 or Windows 3.1 disks (floppies and removable media, but not hard drives) on your Macintosh. It's the flip side of DataViz's MacOpener, which is designed for accessing Macintosh files on PCs (see the adjacent review). Although they serve a similar purpose, DOS Mounter 95 has a transparency that MacOpener can't match.



Getting an Extension DOS Mounter 95 unnecessarily adds DOS extensions to Windows 95 files.

I tested DOS Mounter 95 on a Micron P90 running Windows 95 and on a Power Macintosh 7100/80, transferring Microsoft Word and Excel files. Although DOS Mounter 95's control panel has an interface for getting file information (see "Getting an Extension") and mapping DOS extensions to your Mac applications, you don't need the interface to transfer files.

Like Software Architects' PC product Here & Now (see *Reviews*, November 1995), DOS Mounter 95 is easy to use. Slip in a PC-format disk and its icon pops up on your Mac's desktop. The program handles Windows 95 and Windows 3.1 files with equal ease.

DOS Mounter 95 isn't perfect, though. The installation process required me to first delete DOS Mounter 5.0 (or any other DOS mounting utilities), then install DOS Mounter 95 in the Control Panels folder and install the Multi-Mounter utility in the Extensions folder. Unlike many similar applications, DOS Mounter 95 has no installer utility to delete previous versions and put the various new pieces where they belong.

If you're going to be exchanging files a lot, you'll have to leap some file-naming hurdles. Windows 95's long file names appeared without a hitch; in fact, because Windows 95 allows 255 characters and the Mac allows only 31, it's now the Windows file names that get truncated when moved to a Mac. A Windows file named Macworld Catalog of Feature Stories, 1995 became Macworld Catalog of Fe~BCG.doc.

The ~BCG is a random designation that DOS Mounter 95 generates. According to Software Architects, DOS Mounter 95 adds the 3-character DOS extension so that a PC can still read the files. When I took the disk back to the PC, Win 95 recognized the files as Word but truncated the file names to 8 characters; Win 95 automatically hid the extension.

It's important to remember that because DOS Mounter 95 is a file-transfer utility—not a conversion utility—you need to have both the Mac and the PC version of each application. Unfortunately, version equivalency is becoming a problem for Macintosh users; Word 7.0 is available for Windows 95, while many Macintosh users are still using Word for Mac 5.1 or 6. That means you'll have to save your PC files to the older application version's format in order to read the files on a Mac.

The Last Word

Most of the things that make DOS Mounter 95 a problem can be traced to quirks in Windows 95 and the Mac OS rather than any inherent shortcomings. You'll love the ease of transferring files between platforms—just watch out for those name truncations.—HOWARD BALDWIN

RATING: ★★★/6.8 **PROS:** Recognizes Windows 95 long file names. **CONS:** Installation process isn't intuitive; no hard drive support; file-name truncations can be troublesome. **COMPANY:** Software Architects (206/487-0122, *sales@softarch.com*). **LIST PRICE:** $100.

MacOpener

NONINTUITIVE MAC-TO-WINDOWS FILE-TRANSFER UTILITY

YOU'D THINK THAT AFTER CRITIcizing one application for lacking a crucial feature I'd be thrilled to find a competitive product that has that missing piece. I'm not.

Designed to let you read Macintosh floppies, SCSI disks, and CD-ROMs on a PC, DataViz's MacOpener offers a major usability improvement over its competition: Unlike Software Architects' Here & Now (see *Reviews*, November 1995), MacOpener prompts you to create new names in Windows 3's eight-dot-three format for transferred files. If you're transferring a group of files that all begin with the same eight letters, this method ensures that you don't end up with randomly generated names.



The Option Play MacOpener easily handles Windows 95's long file names but sometimes replaces dashes with strange characters.

Unfortunately, that's the only way MacOpener surpasses the competition. I tested MacOpener on both a 486-based Compaq laptop running Windows 3.1 and a Pentium-based Micron P90 running Windows 95, and I found that although the utility offers some helpful options for the actual file-transfer process, it forces you to work the way it's designed rather than the way you're used to working.

MacOpener installs device drivers—either in the autoexec.bat file or the config.sys file—that let you open Mac files either from the File Manager or from a Windows application. If you choose not to install the drivers, you're forced to launch MacOpener and go through its interface to open or transfer files.

Alas, MacOpener installed the recommended autoexec.bat driver incorrectly. Even after I corrected its mistake, I still got error messages; I learned the hard way that MacOpener needs to create a logical drive for itself using the last available drive designation. If your system's D:, E:, and F: drives are already allocated to storage or network devices, you have to modify your config.sys file to create a logical G: drive just for MacOpener. Even if you normally click on the A: drive to open a floppy, MacOpener forces you to click on this phantom G: drive instead.

The biggest frustration was having to call DataViz to find out what was wrong—this drive-mapping procedure isn't spelled out in the manual. In my book, a simple file-transfer utility should neither be this nonintuitive nor require so much modification of system files.

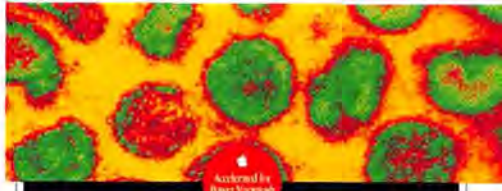
That's not all I disliked about MacOpener. MacOpener won't perform conversion functions and requires that you have a version of the target application on both platforms in order to perform a transfer. Like Here & Now, MacOpener is flummoxed by periods in file names, which it assumes precede the file extension; it's not so hot with dashes either (see "The Option Play"). It offers no device drivers for Windows 95, completely eliminating the option of opening a file within File Manager or an application for Win 95 users.

There are some small niceties to soften the blow. MacOpener lets you preview ASCII text and graphics (but not spreadsheets), and it lets you delete applications from its interface. And it works fine with Windows 95's long file names.

The Last Word

I would have been happier with MacOpener if it were as easy to use as Here & Now: pop in the Mac disk and open the file. MacOpener is doubly disappointing because DataViz, developer of the file-conversion package Conversions Plus, is second-to-market in a field it pioneered, and it has delivered an inferior product to boot.—HOWARD BALDWIN

RATING: ★★/4.5 **PROS:** Provides options for renaming Mac files under Windows 3.1. **CONS:** Forces you to use logical drives in File Manager; device drivers are unavailable for Windows 95. **COMPANY:** DataViz (203/268-0030, *info@dataviz.com*). **LIST PRICE:** $75.



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For more information about the new Alps Desktop GlidePoint, Alps Portable GlidePoint, and Alps' full line of GlidePoint and other peripheral products, or for a reseller near you, call 1-800-720-ALPS (2577).

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Circle 22 on reader service card

Chinon ES-3000

DIGITAL CAMERA ZOOMS IN

LIKE THE APPLE QUICKTAKE 150 and Kodak Digital Camera 40 (see *Reviews*, January 1996), the Chinon ES-3000 is the optical equivalent of a $50 film camera; it costs about 20 times more only because it takes computer pictures. No developing, no scanning—just shoot the pics, copy them to your hard drive, decode them, and they're ready to go. You're paying for convenience, not quality or control.



Two Cameras, One View I shot these two photos within seconds of each other from the same position and looking in the same direction. The ES-3000 (left) let me get closer to the action with its built-in zoom, but the Digital Camera 40 (right) provided better color and more subtle contrast, especially in the sky and trees.

Generally speaking, the ES-3000 offers more optical flexibility than either the QuickTake or the Digital Camera 40 (DC40), which are fixed-focus cameras that can shoot objects 4 feet or more away and require special lenses for close-up shots. The ES-3000 offers an autofocus function with a range as close as 19 inches. Given the limited resolution of the ES-3000's images, the primary benefit of its autofocus system is that you can capture close-up shots (19 inches to 4 feet) without extra lenses. The ES-3000 also includes viewfinder guides to help you frame close-up shots; with the Apple and Kodak cameras, it's all guesswork.

The ES-3000's variable zoom lets you shoot at up to 3× magnification—continuously, not in fixed increments. The camcorder-style buttons, positioned next to the shutter-release for easy access, have distinctive shapes so you can keep your eye glued to the viewfinder. Although the ES-3000 is not a single-lens reflex camera, the zoom affects both the viewfinder and the lens. Heavy zoom use can affect battery life dramatically, but it's an excellent capability that I wish other consumer-quality digital cameras offered.

The ES-3000 doesn't fare well in the areas of resolution, image capacity, and color quality, especially when compared with the DC40. Like the QuickTake, the ES-3000 takes 640-by-480-pixel images; the DC40 goes them 25 percent better. The ES-3000 holds up to 10 full-resolution images, while the QuickTake holds 16 and the DC40 holds 48. But unlike its consumer competitors, the ES-3000 accommodates a PC Card memory-expansion module that stores additional pictures. With a 4MB card (costing $500), for example, the ES-3000 holds up to 43 images.

You can also regulate the amount of compression applied to an image—a feature unique to the ES-3000. Without a PC Card, the camera holds 10 images with standard compression or 5 images with minimal compression. But even with light compression, ES-3000 images don't hold a candle to those from the DC40 (see "Two Cameras, One View").

As with the DC40, you have to load and decode images from the ES-3000 before you can manipulate them with image-editing software; QuickTake images are ready to go after you copy them to your hard drive.

The Last Word

The ES-3000's software is extremely irritating, but its focus and zoom functions more than compensate. If it managed images better and improved the color quality, I'd recommend it. As it stands, the Digital Camera 40 is the best choice in this class, followed by the ES-3000, and then the QuickTake. Now if only someone would merge the features of all three cameras and cut the price in half, most of us could say good-bye to film for good.

—DEKE McCLELLAND

RATING: ★★★/6.4 **PROS:** Close-up focus and framing guides; 3× zoom function; accepts memory cards. **CONS:** High price; color and detail don't measure up to Digital Camera 40's; needs better software. **COMPANY:** Chinon America (310/533-0274). **LIST PRICE:** $1095.



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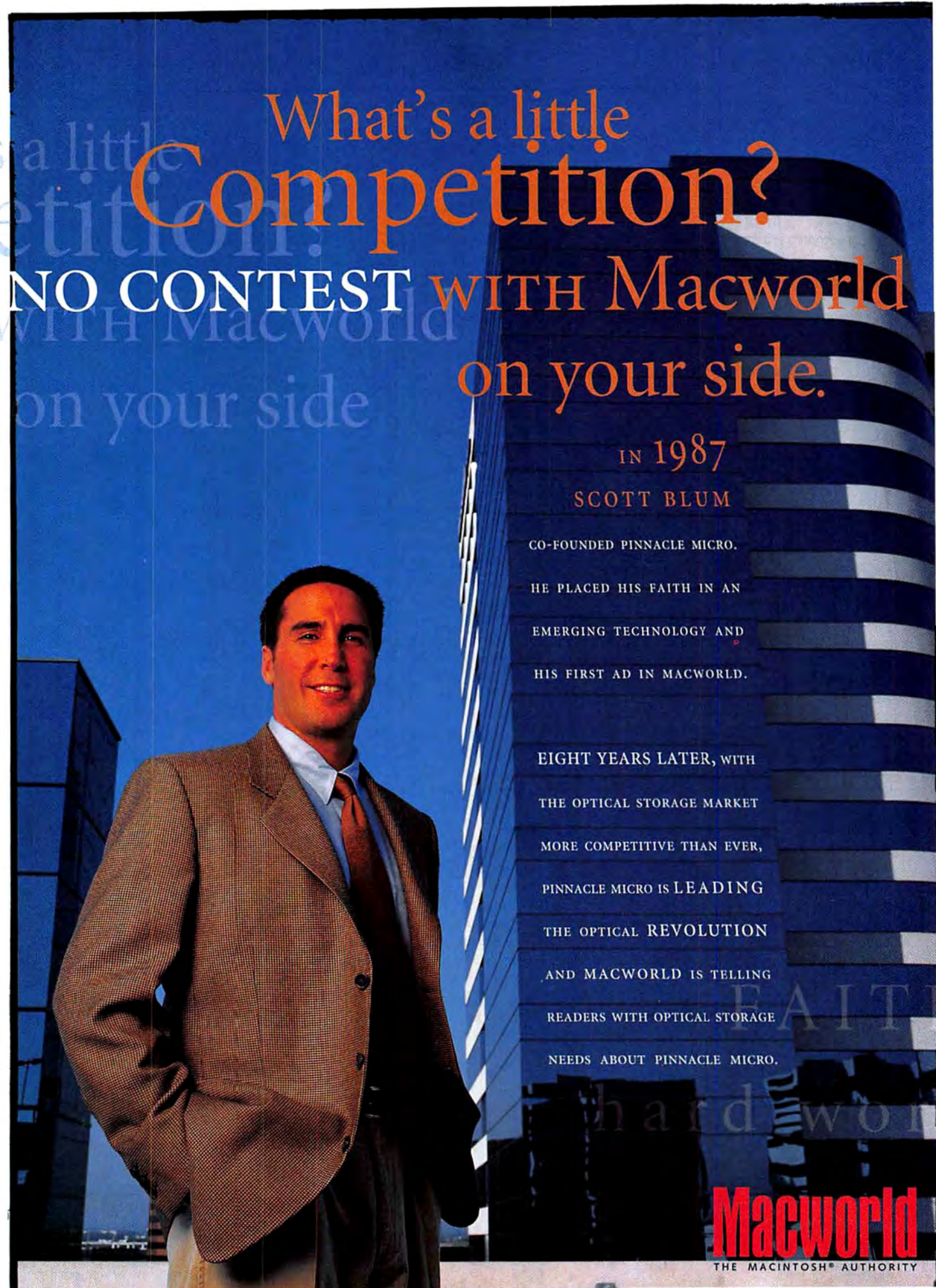
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Circle 25 on reader service card

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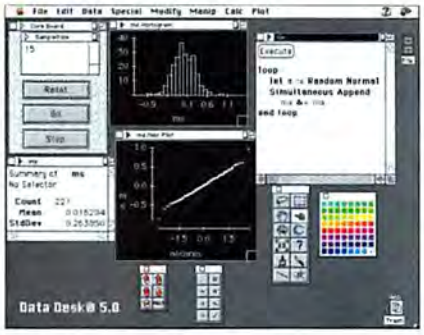
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Data Desk 5.0

CLASSIC STATISTICS PROGRAM ADDS DAZZLING NEW FEATURES

DATA DESK HAS NEVER BEEN YOUR average statistics package. First, because it's based on exploratory data analysis, the central activity is interactive data graphing. Second, it's shockingly compact; it practically fits on a single floppy, in contrast to classics like SPSS that arrive as a boxful of disks. Finally, it's one of the few statistics programs that take advantage of the Mac rather than treating it as a convenient, nearly Windows-compatible alternative.

Version 5.0 demonstrates Data Desk's independent approach. As the version numbers roll by, the competition simply loads on more statistical tests. Data Description, in contrast, has created a programming environment that encourages users to come up with their own specialized statistics. Its new Action Command



Get With the Program Data Desk's new Action Command Language (shown in the little window containing Pascal-like code) lets you generate powerful programs with just a few command lines.

Language consists of looping, branching, and window instructions, combined with math constructs for manipulating data (see "Get With the Program"). Another new feature, the Corkboard, gives you a reference window for storing both displays and buttons that start, stop, or interrupt your action-language programs.

Since you will probably want to reuse the programs you write, Data Desk lets you save an analysis—with programs, Corkboard, and live-graph windows—as a template. The only difference between a template and a normal Data Desk analysis is that the template has variable sockets rather than actual variables; you simply drop new data sets into a template, and the analysis proceeds automatically.

To demonstrate the power of the action-language/template combination, Data Desk has implemented a nonlinear regression procedure (one of the few gaps in its previous test lineup) using these new facilities. It's a great implementation, too: parameters are defined as Data Desk sliders, and you find trial values for parameters through exploratory graphics. Equally impressive are the new templates contributed by Data Desk users—everything from quality control to biomedical test statistics began appearing on the Data Desk Web site (*http://www.datadesk.com/datadesk*) while version 5.0 was still in beta. By the time you see this, several forms of time-series, cluster-analysis, and bootstrap/resampling statistical templates will have appeared at the site, validating Data Description's decision to give users a programming language.

The other major new feature is Slide Show. As implemented in Data Desk, a slide show is not just a series of static pictures, but a sequence of displays with live windows, moving graphs, scrolling text, and working program buttons. You can place an icon associated with each display in a specific order for presentation.

Version 5.0 incorporates several other major and minor improvements. The speed on Power Mac systems, for example, is amazing—Macworld Lab's standard regression tests take less time than a screen redraw, and graphing is instantaneous (a very nice touch in exploratory analysis). The data-transformation commands now include a dozen probability distributions and gamma and log gamma functions. Plots in 5.0 support scatterplot overlays, and the color assignments in plots are significantly more intelligent. In the new File Cabinet icon that appears on the desktop, you can store the typical Data Desk collections of linked slide shows, data sets, and templates.

The Last Word

Data Desk 5.0 is a great statistics program *and* a great Mac program. For exploratory data analysis and interactive statistical graphics, it's still the leader.—CHARLES SEITER

RATING: ★★★★★/9.7 **PROS:** Fast, compact, feature-loaded program; retains emphasis on data exploration. **CONS:** None. **COMPANY:** Data Description (607/257-1000, *info@datadesk.com*). **LIST PRICE:** $625.

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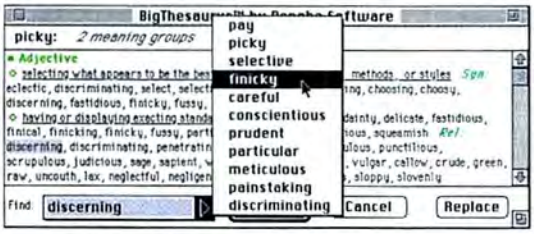
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Spelling Coach Professional 4.1

ADDS DICTIONARY AND THESAURUS TO ALMOST ANY APPLICATION

YOU MAY BE SKEPTICAL ABOUT A program that runs a spelling check on your documents—after all, that feature is most likely built into your word processor. But Spelling Coach Professional is much more than a spelling checker. It appears automatically in the menu bar of most popular Macintosh programs—not just word processors—*and* it contains an online dictionary, a feature most word processors don't have. Based on *Webster's Ninth New Collegiate Dictionary*, the Spelling Coach dictionary is not especially elegant or comprehensive—it doesn't have an entry for *comprehensive*, for example—but it may suffice when you're too lazy to pull a heavy volume off the shelf.



And Today's Secret Word Is . . . Spelling Coach's thesaurus is far more complete, more clearly organized, and easier to use than those in Word 5.1 and 6.0 and WordPerfect 3.5. A pop-up menu lets you return quickly to previously viewed entries.

Unlike the spelling checkers in most Mac word processors, Spelling Coach can check your spelling as you type and beep or flash the menu bar when you make a mistake. You can get suggestions automatically in a pop-up menu (a distraction if you make as many mistakes as I do) or only when you ask for them. Too bad Spelling Coach can't quietly fix common errors automatically the way Microsoft Word 6.0's AutoCorrect and Novell WordPerfect's QuickCorrect can.

Spelling Coach can check a selection or an entire document, either stopping at each error or reviewing all of them at the end. The process was blazingly fast on my Power Mac 7500, even though I didn't take advantage of the option to load the dictionaries into RAM. Equally important (and impressive)—and unlike the spelling checkers in Word 5.1 and 6.0 and WordPerfect 3.5—Spelling Coach lets you control the process from the keyboard. In tests, Spelling Coach was more successful than Word and WordPerfect at suggesting the correct spelling as its first choice. Another convenient feature most other checkers don't offer is the ability to indicate the appropriate endings when you're adding a word to the user dictionary; that way, you have the root word plus all its variants in one entry.

When batch checking, Spelling Coach works best with the several dozen major applications for which it has been fine-tuned—including all the popular word processors, ClarisWorks, Microsoft Works, Microsoft Excel, and QuarkXPress (but not, sadly, Adobe PageMaker). In other programs, Spelling Coach uses the Clipboard to process your errors; the drawback is that this method does not preserve formatting (boldface, italic, and so on) when it corrects words.

Besides the spelling checker and dictionary, Spelling Coach contains BigThesaurus (also available separately), one of the best online thesauruses I've used. Other tools allow you to hyphenate text or change its case, convert single and double apostrophes to typographers' quotes, and list word frequencies. The package also includes supplementary legal, technical, and medical dictionaries.

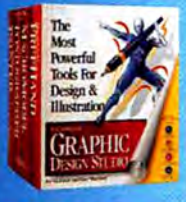
The Last Word

If you're happy with your word processor's built-in spelling checker and don't need such a tool in other applications, keep your hand on your wallet. And if you're searching for a good online dictionary, keep looking. But if you've ever longed for a highly efficient spelling checker or an online thesaurus with real substance, I recommend Spelling Coach Professional.—ROBERT C. ECKHARDT

RATING: ★★★★/7.1 **PROS:** Fast and efficient; runs entirely from keyboard; excellent thesaurus; includes legal, medical, and technical dictionaries. **CONS:** Poor definition dictionary; no automatic corrections. **COMPANY:** Deneba Software (305/596-5644, *deneba@aol.com*). **LIST PRICE:** $69.95.



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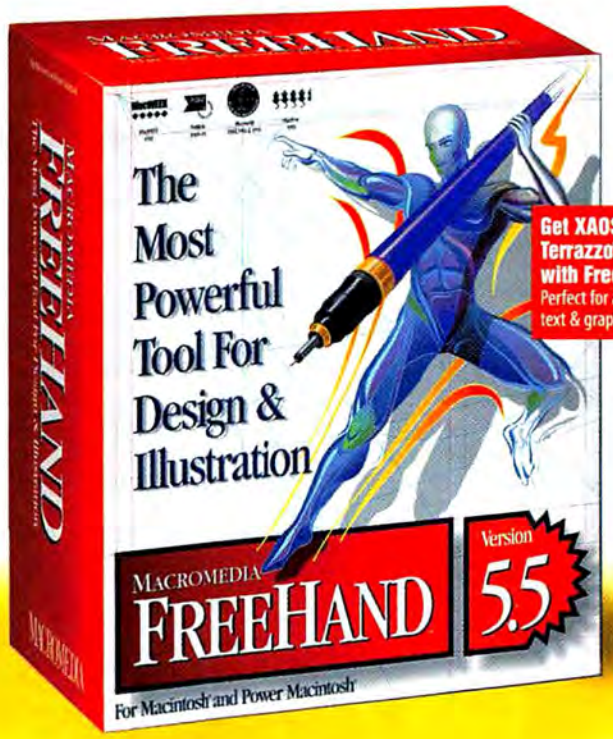
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"FreeHand 5.0 draws past Illustrator in feature race."
—MacWeek

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FreeHand 5 was a smash with users and the media, who named it the top-rated design and illustration program. So what's the scoop on FreeHand 5.5? Well, let's just say we outdid ourselves.

Thanks to powerful new features, you won't have to leave FreeHand each time you want to scan an image or apply filters to one. FreeHand 5.5 supports virtually any third-party Photoshop-compatible scanner or filter, enabling you to use plug-ins like Kai's Power Tools and XAOS Paint Alchemy. You can even use Photoshop acquisition filters to import new file formats, such as Kodak Photo CD.

With FreeHand 5.5, you'll be working faster than you ever imagined. It performs up to 25% faster than before. In fact, FreeHand 5.5 has been clocked at speeds up to 2 times faster than Illustrator 5.5 for common tasks in preview mode. FreeHand 5.5 enables you to import and edit Adobe Acrobat documents, create anti-aliased bitmap graphics, and it ships with 500 fonts (TrueType and Type 1), 10,000 clip art images, and more.

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PaperPort Vx

DESKTOP SCANNER JUST GETS BETTER



RICHARD RETHEMEYER

HOW DO YOU IMPROVE A NEARLY flawless product? You add features, speed performance, and lower the price. That's exactly what Visioneer has done with the PaperPort Vx, a follow-on to the original PaperPort desktop document scanner.

This next-generation PaperPort works just like its predecessor: as a convenient slot behind your keyboard, into which you feed the documents of modern life—letters, bills, business cards—for instant archival storage on disk. Once they're archived, you can arrange, stack, annotate, print, fax, file, E-mail, and perform OCR on them. Inter-application links let you move documents between the PaperPort and other apps effortlessly. You can retrieve stored documents with a keyword search.

This version introduces a ream of new features: 8-bit gray scale, faster scanning, 400-dpi resolution, additional application links, Power Mac–native code, improved OCR speed and accuracy, Finder drag-and-drop support, and future upgradability to a SCSI interface. (Visioneer says you can convert the PaperPort's new serial interface technology to SCSI with an upgrade kit that should be available in the first quarter of 1996 at an estimated cost of $90.)

The PaperPort's signature feature is the ability to drag scanned documents to an icon dock that provides links to other applications. The PaperPort automatically converts the documents to the appropriate format, performing OCR if necessary, and then launches the application. The new software adds 20 application links, including Adobe Acrobat and Photoshop, ClarisWorks, Lotus Notes, and Microsoft Exchange. Visioneer has replaced the original Calera Recognition Systems' WordScan OCR with the faster and more accurate Caere OmniPage Limited Edition. You can also add links of your own. And in a pinch, you can drag documents directly to folders or applications in the Finder.

The PaperPort's annotation tools let you mark up documents and add searchable text, providing a powerful retrieval tool. Image-manipulation tools include rotation, manual and automatic straightening, contrast adjustment, and cropping. A new image-resolution–enhancement feature improves image contrast and edge definition via a slower, interpolating scan process. A printing extension lets you print documents from other applications directly into the PaperPort's desktop, where you can use all the PaperPort's image-manipulation and archiving tools.

The Last Word The PaperPort Vx improves nicely on an already elegant desktop scanner. Its 400-dpi gray-scale scanning, speedier processing, enhanced user interface, extensive interoperability, and lower price keep the PaperPort at the head of the pack for personal document processing. —MEL BECKMAN

RATING: ★★★★★/9.6 **PROS:** Eight-bit gray scale; compact scanning hardware; self-launching image software; document-management and -annotation tools; built-in OCR and printer importing; links to fax and text applications. **CONS:** None. **COMPANY:** Visioneer (415/493-9599, *info@visioneer.com*). **COMPANY'S ESTIMATED PRICE:** $369.

CyberFinder

TRACK INTERNET URLS VIA THE FINDER

LATELY I'VE BEEN THINKING OF THE Internet as an extension of my subconscious: a wildly disorganized collection of marginalia, factoids, and pointers to information that may not matter today but might tomorrow. I don't expect to find a tool for organizing my id, but I do want tools for storing and retrieving resources I find in my Internet travels.

The bookmark metaphor that many Internet applications use to track URLs (Universal Resource Locators) works—if you visit only a handful of sites. CyberFinder 2.0, a control panel from Aladdin Systems, tries to extend that metaphor.

CyberFinder links Internet applications such as Netscape Navigator and Fetch at the Finder level. You assign hot keys for launching and capturing URLs from just about any app based on the file type. So if your mom sends you the URL for her Web page, you can highlight the URL and hit a hot key to launch your Web browser.

But these features are already available in shareware. The full version of Peter Lewis's Internet Config (in fact, CyberFinder uses a part of this freeware product to help link applications) offers hot-key URL launching and even links your applications' preferences. With a little more work you can get similar functionality from KeyQuencer, a $10 shareware macro program by Alessandro Montalcini.

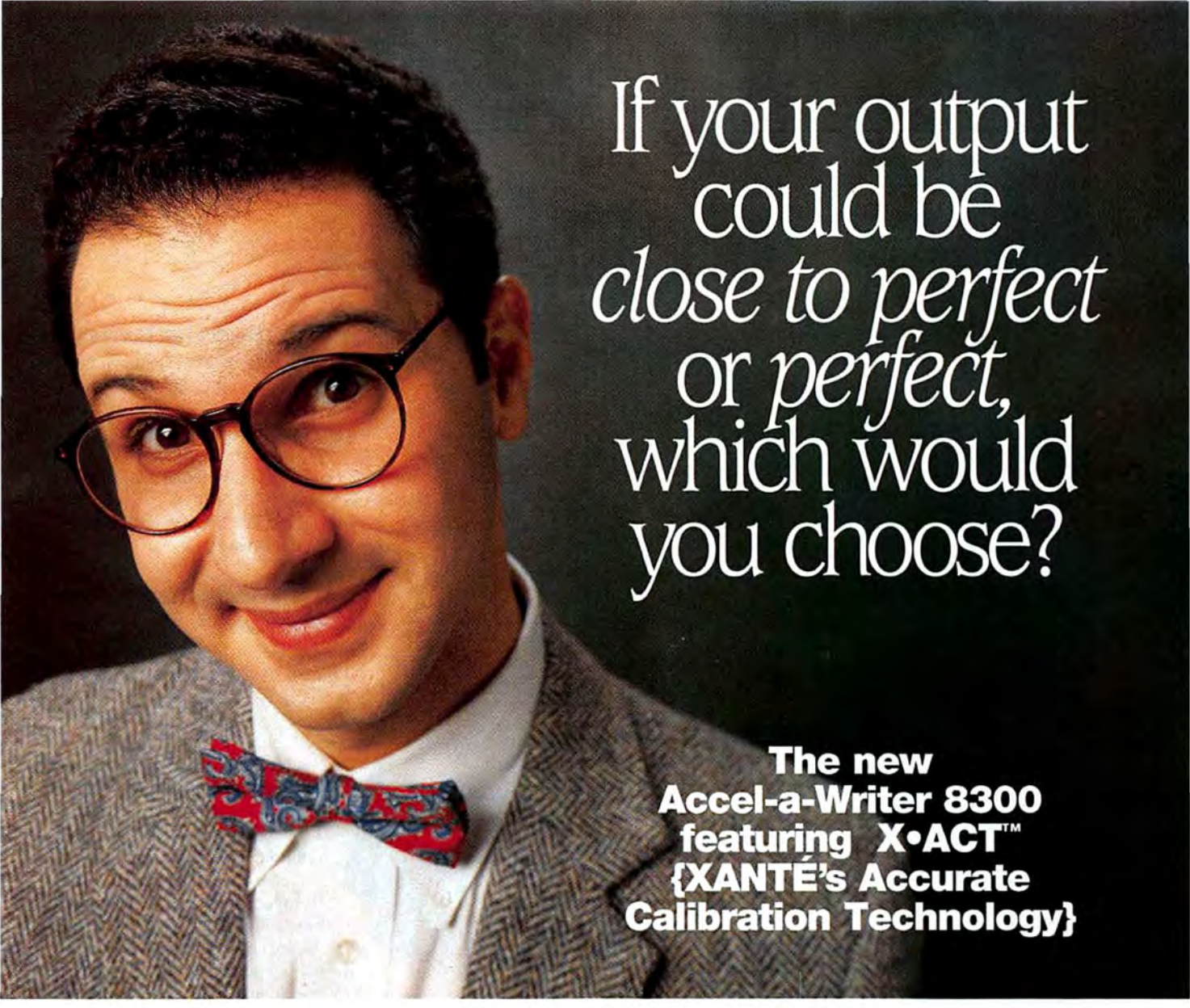


Lost in Cyberspace CyberFinder's libraries are a simple way to organize your bookmarks but aren't much help when you are looking for a specific site.

What differentiates CyberFinder is a hot key that lets you capture and collect a group of URLs into a *library*. The software displays libraries in Finder-like windows you can view, sort, and edit. An icon represents each URL; to open an URL, double-click on its icon or drag the icon into a drag-aware app's open window. (You also drag to reorganize library files.) CyberFinder translates bookmarks or hot lists from most Web browsers into editable libraries. If you've struggled with Netscape's dreadful bookmark tools, you'll appreciate this. Double-click on the Netscape Bookmark file stored in your Preferences folder, and create folders for different categories and subjects as easily as in the Finder. Then drag and drop each URL into the correct folder.

The Last Word CyberFinder integrates the Internet right into the Mac's OS via the Finder. Unfortunately, that also limits CyberFinder's usefulness. The Finder isn't a robust organizational tool for URLs, and CyberFinder has no real search function. Bookmarks are an unsatisfactory solution for large collections of Internet links; but compared with shareware that has similar functionality, CyberFinder isn't a much better option.—MATTHEW HAWN

RATING: ★★/4.9 **PROS:** Low-level integration with the Mac's Finder; ease of use; URL launching from any application. **CONS:** Finder-style organization isn't innovative or effective as a tool for URL organization; no search tools. **COMPANY:** Aladdin Systems (408/761-6200, *info@aladdinsys.com*). **LIST PRICE:** $30.



Perfect output at a surprisingly perfect price. For the first time in laser printer history, the new Accel-a-Writer 8300 with **X•ACT** allows you to calibrate the accuracy of your printer to within the width of a single dot. No other printer on the market delivers these exacting standards. And true **Adobe™ PostScript™** offers another standard of perfection with high performance and incredible output accuracy.

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You Don't Know Jack

"JEOPARDY!" WITH A BAD ATTITUDE

SAYING THAT YOU DON'T KNOW Jack is a trivia game is like calling Steve Jobs the chairman of Pixar—there's a lot more to it than that. Imagine a game show hosted by a combination of Groucho Marx and Howard Stern, and you've got a pretty good idea of this game. You Don't Know Jack's host abuses you if you don't follow instructions or answer correctly, and the offbeat questions seem devised by people severely damaged by an overdose of seventies sitcom reruns.

As in TV game shows, each correct answer is worth a dollar amount, which is deducted from your score if you answer incorrectly. According to Berkeley Systems, you can play for about 20 hours, or 800 questions, without repetition—if your good sense will let you. This game actively pushes the bounds of good taste. For instance, each player buzzes with the Q, B, and P keys, which the announcer clarifies with chatter like, "That's *Q* as in quickie, *B* as in birth canal, and *P* as in personal hygiene."

Games can be either 7 or 21 questions long. In each game, you get at least one rhyme-based "gibberish question," which



Catch a Clue, Dude! The inanities include rhyming gibberish questions, whose dollar value decreases as time ticks by and the number of clues increases.

tests your knowledge of popular culture by giving you a clue to decipher a nonsense sentence (see "Catch a Clue, Dude!"). The categories and clues of all the questions are rather odd, so while you might figure out the answers, you won't be sure it's a topic you know until you see the questions.

The game wraps up with a lightning round called Jack Attack; players buzz in when two related words swirl onto the screen at the same time. For instance, the clue "Read all about it" included magazines and their subject matter. The word *Macworld* naturally matched with *computers*.

The questions are so bizarre, you may have no inkling of the answer—which means your opponents may not know either. That's where Screws come in. By buzzing in and hitting S on the keyboard, you can designate the person you want to sabotage with a tough question. Be judicious—you have only one Screw, and if it turns out that your opponent knows the answer, he or she gets the money *and* you lose it.

You Don't Know Jack isn't perfect. You can't use the Screws on gibberish questions, but the smarmy announcer doesn't tell you that. The box misleadingly says you can play with up to 255 players, but network play isn't available yet—the manual outlines a low-tech tournament scenario where the winners of three-player games move on to the next round. And huddling around a keyboard—even with your closest friends and colleagues—is as weird as the game itself.

The Last Word If you're easily offended, you might want to pass on this game. But if you want to mix Generation X cynicism with Groucho-esque sarcasm, get to know You Don't Know Jack.—HOWARD BALDWIN

RATING: ★★★★/8.9 **PROS:** Witty piece of retro multimedia. **CONS:** Huddling around a keyboard is no fun; network capability not available. **COMPANY:** Berkeley Systems (510/540-5535, *info@berksys.com*). **LIST PRICE:** $30.

Marathon 2

THE CARNAGE CONTINUES

BUNGIE SOFTWARE HAS DONE IT again. If you liked the original marathon, then you'll love Marathon 2: Durandal. Marathon 2's enemies are nastier, the play is faster-paced, and there are plenty of new surprises.

Unlike in the original game, you're no longer aboard the Starship Marathon. It's now 17 years later, and you've been kidnapped by Durandal—the rogue personality who was the brains behind the defense of the original colony ship—and whisked away to a planet orbiting a star 97 light-years from the center of the Milky Way. You obey Durandal's bidding through his remote guidance; he's taken over video displays on the planet and communicates with you periodically through them.

As in the original Marathon, the ultimate goal of the new version is to rid the planet of every mutant creature that rears its ugly head. The images are even more graphic and gore-filled than those in the original Marathon, and the movement is fluid and quick. I found myself relying solely on reflex and the tools at hand (the motion detector is especially invaluable) to



Marathon Manners The BOBs are back—and this time around, they're packin' ammo and attitudes.

get me through some tight spots—especially when green sewer-dwelling monsters started to close in. New mutant drones can be extremely hazardous to your health if you're not armed to the teeth before confronting them.

One of the best new network features is the addition of real-time audio. A simple dialog-box option lets you talk to the other networked players through the microphone on your Mac and lead your team through the rough spots. If you've ever played a network game without this feature, you know how frustrating it is to have to guess what your teammates are doing.

There are a number of different options for networked play, many of them grotesque variants on schoolyard games like tag or king of the hill. In addition to the straightforward Team and Every Man for Himself, other scenarios include Kill the Guy with the Ball—the object is to maintain possession of a gruesome skull for the longest time. My favorite network option is the Cooperative scheme, where players assist one another to complete each level. I was impressed to find you must select Cooperative mode in order to play the entire plot. Although you can still accidentally kill other players in this mode, it's not designed that way. If you want to actively kill one another, you're confined to single-level arenas.

The Last Word Marathon 2: Durandal is a well-crafted action-adventure game, but it's not for the squeamish or those disturbed by violence. The game's increased network capabilities and fluid, engaging play make for a compelling adventure.

—FRED DELISIO

RATING: ★★★★/8.5 **PROS:** Fast-paced adventure; lots of new foes and faces; enhanced network support for multiple players. **CONS:** Ultraviolent; promotes "every man for himself" ideals in some multiple-player options. **COMPANY:** Bungie Software Products (312/563-6200, *info@bungie.com*). **LIST PRICE:** $79.

upFront 2.0.1

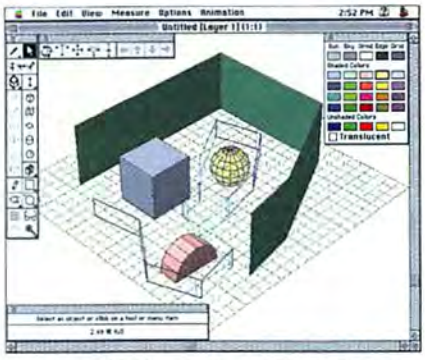
NEW VENDOR REVAMPS 3-D MODELER

BACK WHEN I FIRST HEARD THAT Silicon Graphics had acquired Alias, I observed a moment of silence for upFront, Alias's entry-level 3-D–modeling package. I thought it would disappear altogether. When I heard that upFront had been acquired by SketchTech, I was interested in seeing what new features had been added to the old standby.

upFront 2.0.1 sports an improved set of modeling and shape-editing tools. With just a few clicks of the mouse, even complex shapes are simple to construct and modify. Improved view tools make it a breeze to see models from any angle—a feature that's historically been the weak link in many modeling packages.

upFront's wide variety of tools, coupled with its ability to export a variety of standard file formats, makes it a valuable modeling program when used in tandem with high-end rendering and animation applications such as Electric Image and Pixar's RenderMan.

upFront's interface has always been based on the Alias Sketch architecture, and in past versions, the learning curve was steep because you had to memorize a lot of modifiers and hot keys in order to access the product's best features. The new version eliminates virtually all of these arcane keystrokes, and as a result you can unleash the powerful capabilities of this software with far less effort.



An Untangled Web The blue "Spider Walls" define the angle and proximity of an animation path.

Unlike competing packages that use a camera metaphor to define animation paths, upFront uses an animation tool, quizzically dubbed SpiderVision. The user draws a fence-like boundary around the modeled object, to define proximity, height, angle, and speed of travel around the image (see "An Untangled Web").

upFront also allows you to import a 2-D scanned image as a background, so you can model an object matching the perspective of existing objects in the image. An architect could model a building within the scanned image of its surrounding city block, for example.

For simple flybys, upFront easily produces a smooth animation, complete with lighting, shadows, and correct perspectives. But, because it offers few textures and surface controls, upFront is best used for rudimentary conceptualization and design of objects; producing a ray-traced, photo-realistic image or movie requires exporting the file to a high-end rendering package.

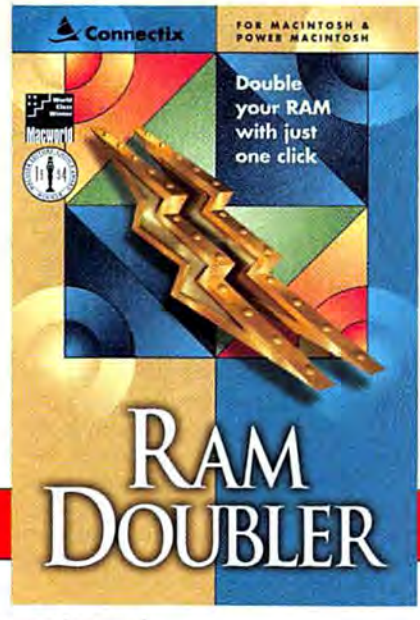
The Last Word A higher level of quality and control over textures and surfaces would put upFront on a par with many of the popular modeling, rendering, and animation packages on the market today. It's already so close that this seems the logical step in its evolution. Otherwise, upFront is a compelling, useful addition to any architect's or modeler's tool box.—FRED DELISO

RATING: ★★★★/8.7 **PROS:** Extremely easy to use; exports to a variety of popular file formats. **CONS:** Minimal textures and surface controls. **COMPANY:** SketchTech (612/379-1435). **LIST PRICE:** $299.

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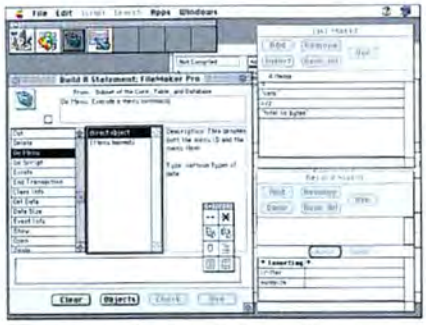
Scripter 1.0.1

SERIOUS DEBUGGING POWER FOR SERIOUS SCRIPTERS

THOUGH APPLE MAY SEEM UNABLE to fulfill its wildest dreams of scripting capability, we can be thankful that others have been more successful. Late Night Software's Script Debugger is a great improvement over AppleScript (see *Reviews*, November 1995). Better still is Main Event's Scripter, the top script-development environment for even the most ambitious projects.

Scripter's virtues are best highlighted by pointing out what scripts should really do—manage files and communications. You could use AppleScript to log on to a remote Macintosh automatically at predetermined times, transfer data into files in your own database, and prepare the data for presentation. (You could also use AppleScript for numeric jobs such as automatic image-format conversion, but you would regret it as the minutes ticked by; this is a job for C++.)

So the best AppleScript development environment is one that plays to AppleScript's strengths, and that's exactly what Scripter does. For example, the Command Builder window lets you browse an application's commands and objects and assemble more-complex commands, or simply fill in command parameters by double-clicking on the command in the Command Builder window's dictionary. Scripter checks syntax at this level, before you insert the command into a working script. An independent Command window lets you test commands for immediate execution (see "Compartmentalization"). Between this facility and the Builder window, you can quickly manipulate files from inside an application.



Compartmentalization Scripter offers separate windows for AppleScript elements and displays the AppleScript keyword elements or scriptable applications in a Command window.

This is where Scripter's debugging facility comes into play for interapplication communication. Because Scripter (alone among AppleScript-enhancement products) keeps track of variable local values inside loops and handlers, you can develop a simple set of tests for making sure complex scripts are doing what you intended as they pass values between apps.

Other nice touches: an editor that can Undo everything; a tool palette of shortcuts; and a Collection window that lists often-used scripts, handlers, and fragments. The manual explains features adequately, but for actual script design you'll need Derrick Schneider's *Tao of AppleScript* (Hayden, 1994)—Scripter doesn't do much hand-holding.

The Last Word If you want to use AppleScript to make your Mac beep at you, any AppleScript editor will do. If you want to make sure a script is polling remote data stations correctly to generate reports from Microsoft Excel, you need Scripter. For corporate or commercial scripters, its debugging power makes it the clear scripting leader.—CHARLES SEITER

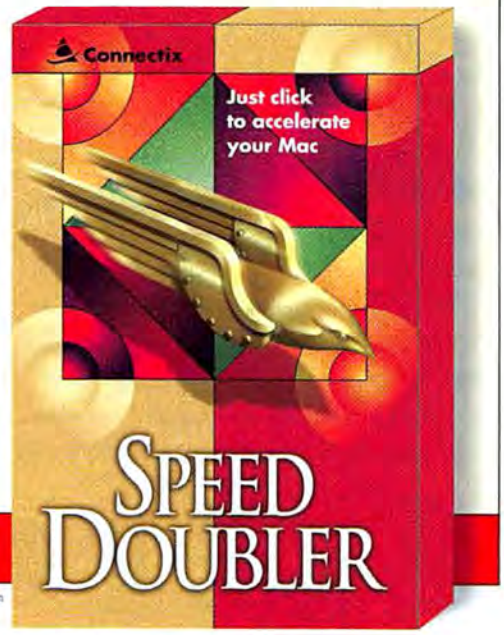
RATING: ★★★★/8.4 **PROS:** Convenient editor; superior debugging capabilities for interapplication communication; excellent display structure. **CONS:** Terse documentation. **COMPANY:** Main Event Software (202/298-9595; *mainevent@his.com*). **LIST PRICE:** $199.

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Adobe Premiere 4.2

VIDEO EDITOR REFINES CD-ROM MOVIES

THE TINY VERSION-NUMBER INCREMENT implies that Adobe Premiere 4.2 includes only a few tweaks, but for Premiere addicts in general, and CD-ROM producers in particular, the enhancements are significant.

Premiere 4.2 sports over a dozen minor, but welcome, interface additions: a new tool that lets you change a clip's playback speed by stretching the clip in the Construction window; an audio-dissolve tool that creates cross-fades between two clips; and new keyboard shortcuts for marking in- and out-points, inserting transitions, halting video captures, and more.

You can now organize the Transitions window, removing transitions you don't use and creating and switching between sets of transitions for different projects. New audio filters provide panning, left/right channel swapping, and enhanced downsampling. While these filters provide basic audio functions, the application continues to lack more-advanced audio tools, such as compression and equalization. (You can add them with the $300 AudioTrack plug-in from Waves [423/588-9307, *waves@waves.com*]). New motion-control settings let you create smoother motion paths when animating clips. An added frame-blending feature yields ultrasmooth slow-motion effects.



Better CD-ROM Movies The Movie Maker plug-in provides full control over the compression settings used in CD-ROM movie production.

CD-ROM producers will be most excited by Premiere's new CD-ROM Movie Maker, a plug-in that eliminates grappling with Apple's funky MovieShop utility. CD-ROM Movie Maker provides all the basics—the ability to specify a data rate, to crop and scale movies, and to batch-compress a collection of movies—and adds several extremely useful features. A noise filter cleans up video to improve compression. You can also create an optimized color palette for use on 256-color systems.

CD-ROM Movie Maker also provides superb control over keyframes. Besides being able to create keyframes at regular intervals—something all compression utilities support—CD-ROM Movie Maker lets you specify that keyframes be generated at edit points or at markers defined in Premiere's Construction window.

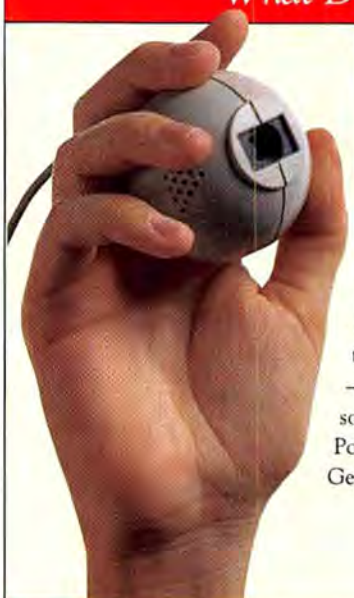
While there's a lot of good news in this upgrade, Premiere's basic operating style—having to compile previews and transitions, for example—still makes it unsuitable for time-pressured broadcast pros. Unless you use Premiere with dedicated hardware that provides transition acceleration, you'll wait each time you view the results of an edit.

The Last Word Even if you don't make movies for CD-ROMs, there's a lot to like in this upgrade. Video pros are likely to prefer the dedicated editors that accompany high-end hardware, but Premiere remains the best general-purpose, QuickTime-based video-editing package available.—JIM HEID

RATING ★★★★/7.4 **PROS:** Excellent CD-ROM moviemaking features; useful interface tweaks; improved performance. **CONS:** Minimal audio tools; slow processing of transitions. **COMPANY:** Adobe Systems (415/961-4400). **LIST PRICE:** $795 (free to registered 4.0 users; $149 for registered users of earlier versions).

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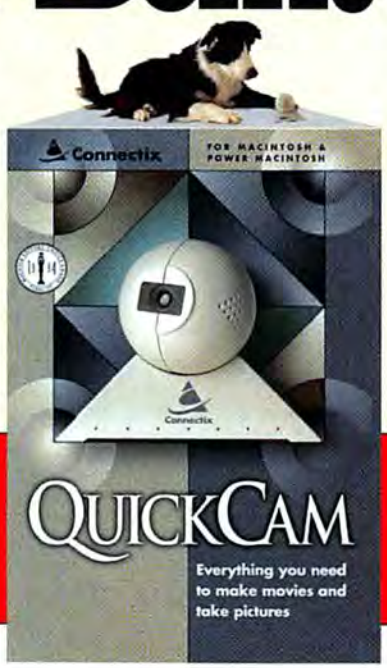
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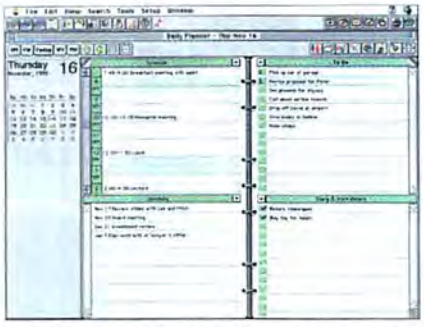
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Day-Timer Organizer 2.0

PIM HAS SOME ROUGH EDGES

FOR ANYONE WHO'S EVER USED A paper-based daily planner, Day-Timer Organizer (DTO) 2.0 will have a familiar feel. This personal information manager (PIM) from Day-Timer Technologies has an interface that's true to its paper lineage, with a pleasing ring-binder motif. A tool bar gives you quick access to views and functions. Each view appears in a separate window, so you can have monthly, daily, and weekly views open at the same time. Unlike bundled programs that share data, such as Now Contact and Now Up-to-Date, DTO lets you manage your contacts and schedules from a single application. But if you're thinking of transferring data from another PIM, beware: DTO only imports text files in which fields are enclosed in quotes and separated by commas.

DTO lets you create two kinds of events: schedule items, which have a date and optional start and end times, and tasks, which are dated to-do items. The event-entry dialog box is an eclectic mix of novel features and annoying quirks. On the plus side, you can enter dates and times in absolute or relative format; for example, you can book a meeting to take place in three days by typing **3d** as the event date or by typing the month and date. You can also schedule recurring or multiday events, define custom fields for each event type, and classify events. I appreciate the advance-notification feature—tasks for which you've requested advance notice appear automatically in the upcoming-events section of the daily view (see "Daily Organizer"). On the minus side, you have to review your calendar to see what lies ahead. DTO does offer a pop-up reminder, but it's too limited to be useful; you can only set an alarm on the day of the event, and you can't specify the snooze interval when an alarm appears.



Daily Organizer The Daily Planner view has space for scheduled and upcoming events, to-do items, and completed tasks.

DTO's address book is uneven as well. Although you have ample space for contact data, such amenities as automatic capitalization and autocompletion—common in dedicated contact managers like Now Contact—are absent. Another shortcoming is that you can't search for an address or phone number without launching DTO.

DTO's printing functions, documentation, and built-in help are adequate, and a brief tutorial is included. (Oddly, the help program doesn't terminate automatically when you quit DTO.)

The Last Word With all the competition, it's hard for a PIM to stand out from the crowd. Unfortunately, DTO's strong points are outweighed by some surprising weaknesses. Unless Day-Timer addresses those shortcomings, I can't recommend it.

—FRANKLIN TESSLER

RATING: ★★/3.7 **PROS:** Attractive interface; previews upcoming events. **CONS:** Limited import capabilities; poor alarm functions; no auto-formatting. **COMPANY:** Day-Timer Technologies (415/572-6260, *sales@dtt.daytimer.com*). **LIST PRICE:** $59.95.

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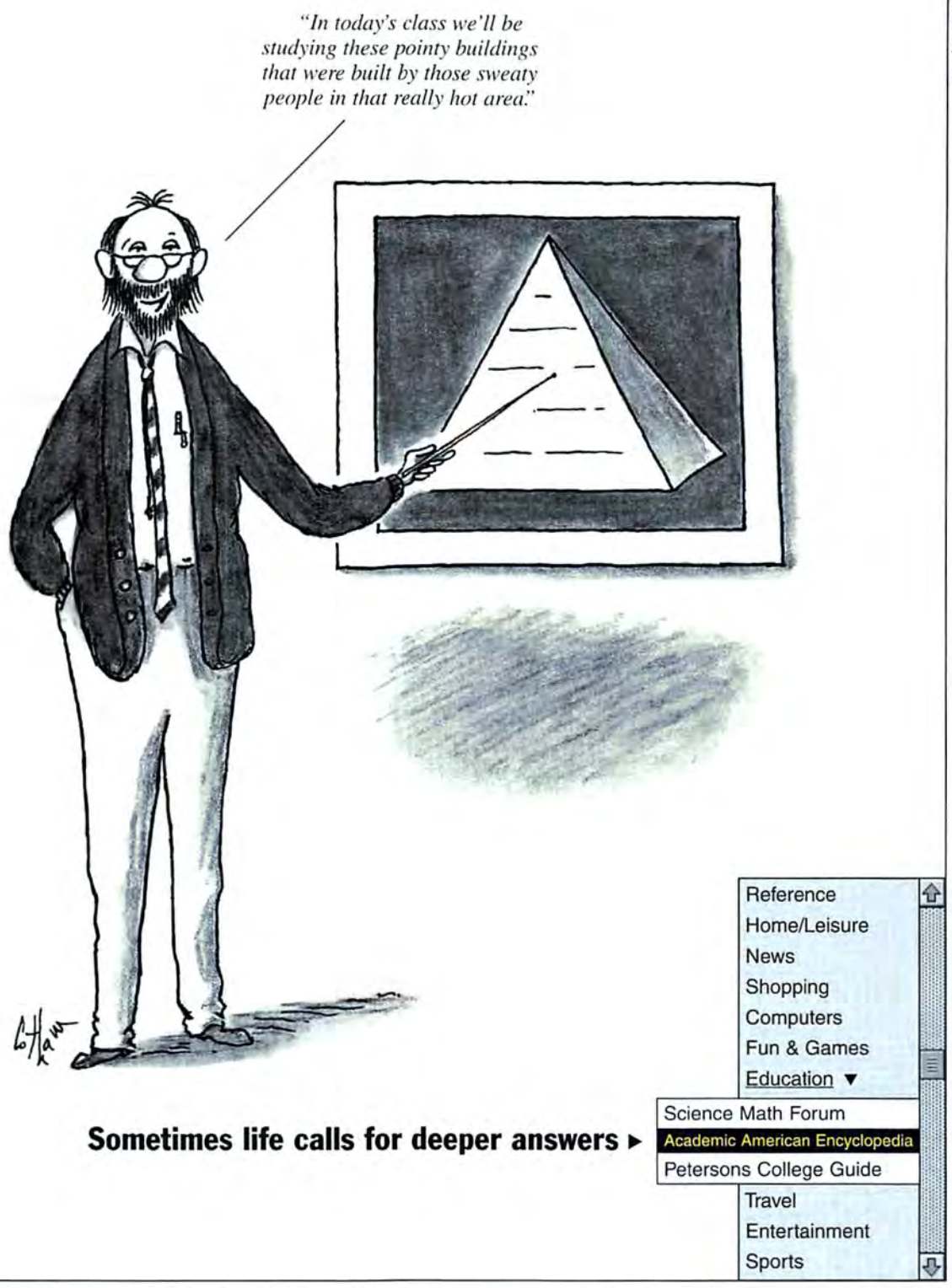
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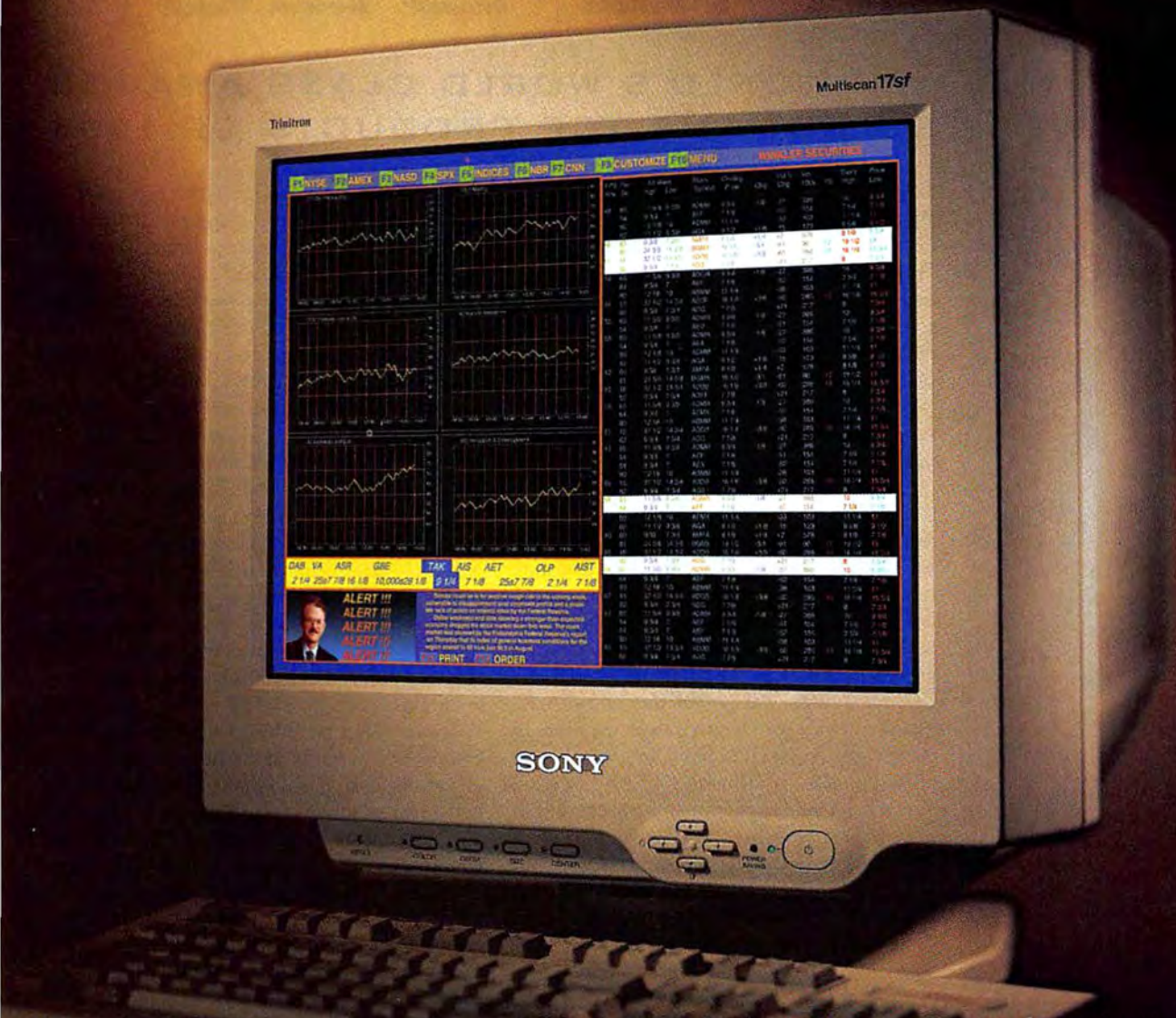
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THE BEST OF THE BEST

MACWORLD'S WORLD CLASS AWARDS SELECT THE TOP PRODUCTS OF 1995

BY CHARLES PILLER

What makes something the best in its class? For an athlete, world-class status requires talent, determination, courage, and superb training. For an idea, one looks for relevance, importance, and breadth of influence. For a computer product, many of those qualities apply. But in this business, creativity, timeliness, and pride of engineering emerge as the key factors.

Once a year, *Macworld* takes time out to recognize the vibrancy and dedication to excellence that have always characterized the Macintosh market. We sift through thousands of offerings to find the few products that deserve to be viewed as superior—not just in comparison to their competition, but on an absolute standard of quality, value, and performance.

To make our selections, we deployed the most rigorous and multifaceted evaluation process ever used in the computer press. Over several months, we polled our editors and expert authors about their views on hundreds of contenders. To be considered, products had to be shipping as of December 1, 1995; we did not restrict our candidates to products that shipped in 1995—no matter when a product first became available, if we thought it was great, we considered it for an award.

To determine the World-Class candidates, we first culled the products reviewed in *Macworld* that achieved a four-star or higher score in our Star Ratings system or that won an Editors' Choice award in one of our comparative features. We also considered products that we had not formally reviewed, if our hands-on experience showed that the product's quality met our expectations for a top-quality product.

More than 50 outside experts—carefully chosen for their knowledge of the Macintosh industry and freedom from financial ties with any Mac-industry vendor—went through a similar process to select the best product. Finally, we went to a random sample of our readers for advice in several critical areas.

As might be expected from any diverse group, there were plenty of arguments and disputes. In each case, debates raged until we reached consensus or a clear majority opinion.

In a handful of cases, the selections were familiar. A few key products captured the high ground as they have in most of the past several awards: ClarisWorks, Now Contact/Now Up-to-Date, Adobe Photoshop, QuarkXPress, Adobe PageMaker, and Macromedia Director. In most cases, however, newcomers held sway. Part of the reason for this is that as the Mac market has evolved, so have *Macworld*'s awards. We've given no awards in several mature product categories—areas such as speakers, fax modems, and hard drives—where technical innovation has slowed and the number of vendors with high-quality products is large. We've omitted categories where no single product could be chosen confidently as truly superior.

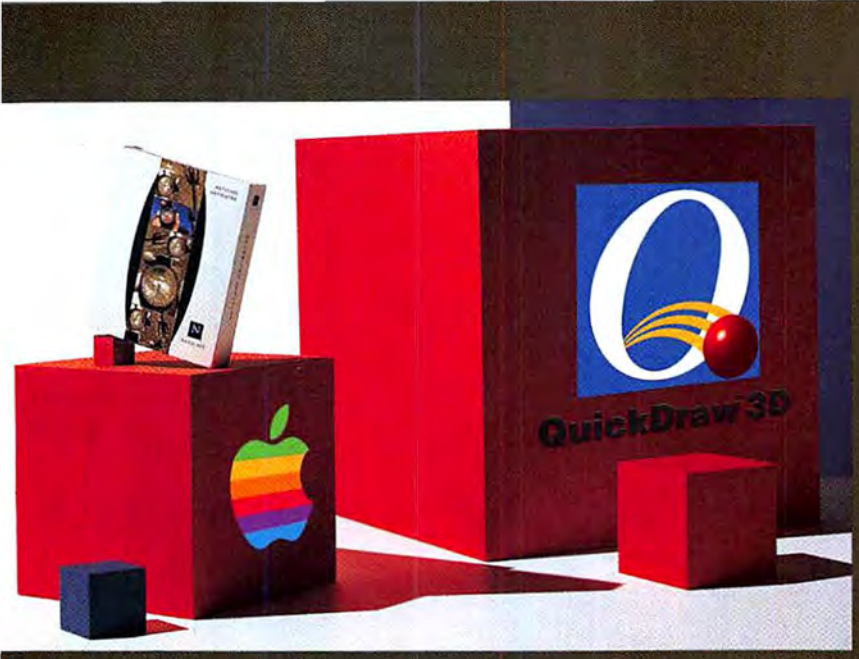
Several awards reflect new realities in Mac computing. In our connectivity-oriented categories, for example, modems or E-mail products once were perennial winners. This year we chose Quarterdeck/StarNine's WebStar, a vital tool in the emergence of the World Wide Web. And we chose Farallon Computing's AirDock infrared transceiver, which ushers in an age of simple wireless networking.

Plus we've added special awards that honor striking achievements—such as Apple Computer's QuickDraw 3D, our winner for Best New Technology, and Netscape Communications' Navigator, our Product of the Year—whose influence has been strongly felt throughout the Macintosh industry as a whole. We offer congratulations to the winners and to the finalists, whose excellent products represent many of the reasons why the Macintosh continues to be a great computer and a technology leader. **m**

Senior editor CHARLES PILLER manages *Macworld*'s features section and reports on the Macintosh clone industry.

PHOTOGRAPHS BY MARK JOHANN


Macworld



SPECIAL AWARDS



SYSTEMS

SPECIAL AWARDS

MOST INNOVATIVE COMPANY

WINNER: Apple Computer

With QuickDraw 3D, QuickTime VR, and OpenDoc—to name a few highlights of the year, not to mention a wide range of improvements on Power Mac hardware—Apple takes this award with ease.

FINALIST: Connectix

MOST PROMISING NEW PRODUCT

WINNER: Navigator, Netscape Communications

Rarely does a single product, in the course of a single year, swamp its competition, change the trajectory of an entire industry, and capture the imagination of millions. Netscape Navigator has done that and more.

BEST NEW TECHNOLOGY

WINNER: QuickDraw 3D, Apple Computer

There's nothing like realism—that's one reason the Mac's graphical approach has always struck such a chord. Now Apple has made 3-D objects a reality on screen, and the pending slew of products for both professional modelers and home gamers shows just how broad this technology's reach will be.

FINALIST: QuickTime VR, Apple Computer

PRODUCT OF THE YEAR

WINNER: Navigator, Netscape Communications

The World Wide Web arrived this year as a seminal force in the history of personal computing. Netscape Navigator is a major reason why.

SYSTEMS

COMPUTER SYSTEM

WINNER: Power Macintosh 7500/100, Apple Computer

The Power Mac 7500 combines forward-looking technologies such as video capture, PCI, and upgradable processors with an industrial design that few computer companies can deliver. And it's priced right.

FINALIST: PowerWave 604/120, Power Computing

STORAGE

WINNER: Zip, Iomega

Portable storage has been a backwater for years because no one figured out how to make it cheap and easy. Iomega has done it, transforming an existing technology—the floppy drive—into a much better one.

FINALIST: EZ135, SyQuest Technology

FINALIST: SiliconExpress IV and ExpressPCI SC, Atto Technology

INPUT DEVICE

WINNER: ArtPad, Wacom Technology

At less than 7 by 7½ inches, this pressure-sensitive tablet is sheer convenience if you need a device you can hide away one moment and readily exhume the next.

FINALIST: Power Secretary, Articulate Systems

FINALIST: Thinking Mouse Macintosh ADB, Kensington Microware

SYSTEM ENHANCEMENT / SOFTWARE

WINNER: Speed Doubler, Connectix



GRAPHICS / DESIGN

Stuck with slow 680X0 emulation? Not anymore, thanks to Speed Doubler—an inexpensive utility that runs 680X0 programs an average of 37 percent faster than the Mac's built-in emulator.

FINALIST: Conflict Catcher, Casady & Greene

SYSTEM ENHANCEMENT / HARDWARE

WINNER: PaperPort Vx, Visioneer

It's not often that a company creates a new, useful product category as quickly as Visioneer has with its PaperPort document-scanning hardware and PaperMax document-management software.

GRAPHICS / DESIGN

GRAPHICS UTILITY

WINNER: DeBabelizer, Equilibrium Technologies

Dealing with different graphics formats and tweaking images to look their best isn't easy. DeBabelizer is the tool that graphics and multimedia professionals use to turn good graphics into great ones.

FINALIST: KPT Vector Effects, MetaTools

ILLUSTRATION SOFTWARE

WINNER: FreeHand, Macromedia

FreeHand 5.0 has gone all out in supporting print media with multiple pages, expanded output control, editable TIFF and PICT images, and the complete use of both Illustrator and Photoshop filters.

FINALIST: SmartSketch, Alias Research

IMAGE-EDITING SOFTWARE

WINNER: Photoshop, Adobe Systems

How often have you heard someone say, "Just Photoshop that blemish out?" Trademark lawyers may not like it when a product name evolves into a verb, but it only happens when that product defines its category—as Photoshop does.

FINALIST: Live Picture, MetaTools

PAGE-LAYOUT / DESIGN-TOOLS SOFTWARE

WINNER: QuarkXPress, Quark

QuarkXPress's many commands and controls, such as type rotation and arbitrary line widths, eliminate the need for workarounds. Professional publishers swear by XPress, and for good reason.

WINNER: PageMaker, Adobe Systems

It's fitting that on its ten-year anniversary, PageMaker has regained its leadership position and again strikes a great balance between intuitiveness and powerful features.

PAINT SOFTWARE

WINNER: Painter, Fractal Design

Superb conventional controls, extraordinary effects, and a tidy interface help Painter achieve something close to perfection.

PROFESSIONAL DISPLAY

WINNER: PressView series, Radius

This is the most serious color pre-



BUSINESS

press display and proofing tool available. You can match display colors to color models in the PressView's database, or use the included colorimeter to calibrate the monitor to output from any device. It's the ultimate in color precision.

SCANNER

WINNER: Arcus II, Agfa

For top-quality scans at a reasonable price, the Arcus II stands well above the competition.

FINALIST: PowerLook, Umax Technologies

VIDEO-DISPLAY CARD

WINNER: Thunder IV and ThunderColor series, Radius

Versatile software and impressive Photoshop and QuickDraw acceleration make the NuBus-based Thunder IV and its PCI-based ThunderColor twin the top choice.

FINALIST: 1724PD, Micro Conversions

GRAPHIC-DESIGN PRINTER

WINNER: Rainbow 2720, 3M Printing and Publishing Systems

Excellent output, the broadest range of proofing options, and support for a wide variety of output media make this the top pick.

FINALIST: ProofPositive Full Page, Radius

BUSINESS

ACCOUNTING SOFTWARE

WINNER: M.Y.O.B., BestWare

With careful elimination of accounting's pomp and circumstance from its vital business function, M.Y.O.B. can empower almost anyone to manage the workings of a small business.

FINALIST: QuickBooks, Intuit

CORE BUSINESS SOFTWARE

WINNER: FileMaker Pro, Claris

FileMaker Pro's accessibility puts useful data-management within reach, and until you get elbow-deep in FileMaker, you won't appreciate how much fun a database can be.

FINALIST: Excel, Microsoft

DATA PRESENTATION SOFTWARE

WINNER: DeltaGraph Pro, DeltaPoint Software

Straddling the line between data-analysis tool and presentation tool is impressive enough, but DeltaGraph goes beyond that to integrate the two in a natural fit—and provides superior capabilities for each.

FINALIST: MapInfo, MapInfo

PRESENTATION SOFTWARE

WINNER: Persuasion, Adobe Systems

Loaded with useful features, Persuasion offers extensive interactive control over graphic elements using easily accessible floating palettes.

FINALIST: PowerPoint, Microsoft

BUSINESS PRINTER

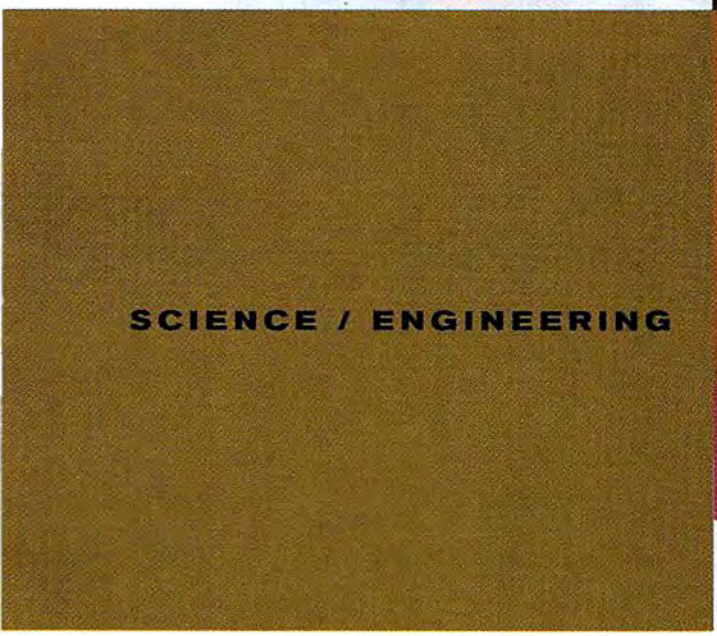
WINNER: LaserWriter 16/600 PS, Apple Computer

If speed is what you need, this printer has it for a reasonable price.

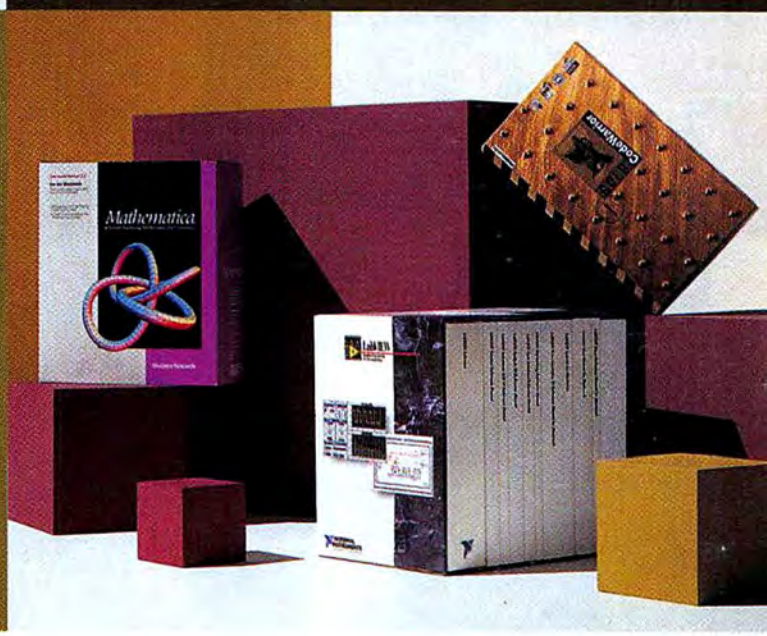
FINALIST: LaserJet 4MV, Hewlett-Packard



MEDIA AUTHORING



SCIENCE / ENGINEERING



MEDIA AUTHORING

MULTIMEDIA AUTHORING

WINNER: Director, Macromedia

With its dynamic animation features and development environment, Director can squeeze more performance out of a CD-ROM than you'd think possible.

FINALIST: SuperCard, Allegiant Technologies

VIDEO-PRODUCTION TOOL

WINNER: After Effects, Adobe Systems

The industry-standard video post-production package, After Effects combines a dazzling array of genuinely useful video-production effects with an approachable user interface and superb rendering quality.

FINALIST: Media 100, Data Translation

AUDIO-PRODUCTION TOOL

WINNER: Deck II, OSC

Deck II brings professional-grade audio recording and soundtrack post-production to anyone with a Power Mac or AV Mac. What used to cost thousands now costs hundreds.

FINALIST: L1 Ultramaximizer, Waves

FINALIST: Pro Tools, Digidesign

CAD SOFTWARE

WINNER: MiniCad, GraphSoft

For a reasonable price, MiniCad offers features normally found only in high-end CAD products—all in an easy-to-learn package.

FINALIST: PowerCADD, Engineered Software

MODELING / RENDERING SOFTWARE

WINNER: KPT Bryce, MetaTools

KPT Bryce represents a remarkable 3-D landscape-rendering program, a CD-ROM of images, a slide-show utility, and some screen-saver modules, all for $200.

WINNER: Infini-D, Specular International

The well-regarded 3-D rendering and animation tool has taken its third component, modeling, and brought it to the same high standard as the rest of the program. The result is a product that stands out from the rest of the pack.

DIGITAL CAMERA

WINNER: DC40, Eastman Kodak

High-resolution images and sufficient storage capacity make this the best filmless camera for most people.

FINALIST: QuickTake 150, Apple Computer

SCIENCE / ENGINEERING

DEVELOPER TOOL / PROGRAMMING ENVIRONMENT

WINNER: CodeWarrior, Metrowerks

Simplicity, compactness, and excellent support have all contributed to CodeWarrior's success and its important role in Apple's transition to the Power Macintosh platform.

FINALIST: AppWare, Novell

MATHEMATICS SOFTWARE

WINNER: Mathematica, Wolfram Research

Mathematica has been implemented so well for the Power Mac that it has made the Macintosh the



PERSONAL



COMMUNICATIONS

platform of choice for the computational needs of scientists and engineers.

FINALIST: Maple, Waterloo Software

TECHNICAL / STATISTICS SOFTWARE

WINNER: LabView, National Instruments

With improved graphing and printing features, Power Mac optimization, and links to HiQ, this instrument-emulation software is a must for any Macintosh-based laboratory.

FINALIST: SPSS for Macintosh, SPSS

FINALIST: StatView, Abacus Concepts

PERSONAL

PERSONAL PRODUCTIVITY SOFTWARE

WINNER: Now Contact and Now Up-to-Date, Now Software

Recent enhancements, like an excellent to-do list and a notepad that is integrally linked with the contact manager and calendar, make this dyad the market leader.

WINNER: ClarisWorks, Claris

Like a Swiss Army Knife that still fits in your pocket, ClarisWorks delivers efficient tools for coping with just about any contingency the home-office hero might face.

PERSONAL PRINTER

WINNER: LaserJet 5MP, Hewlett-Packard

With 600-dpi resolution, support for Adobe PostScript Level 2, and automatic switching for Windows machines and Macs, this printer is a home-office champion.

FINALIST: Color StyleWriter 2400, Apple Computer

GAME

WINNER: Marathon, Bungie Software

One of the finest games anywhere. Relentless action, thoughtful puzzles, an engaging storyline, and outstanding network play make Marathon irresistible. Better yet, Marathon 2 continues the tradition.

WINNER: Myst, Brøderbund Software

If you have any interest in adventure gaming, run out and buy Myst.

FINALIST: SimCity 2000, Brøderbund Software

COMMUNICATIONS

WEB-SITE MANAGER

WINNER: WebStar (formerly MacHTTP), Quarterdeck/StarNine Technologies

This Web server software has no equal when it comes to straightforward setup, administration, and security.

NETWORKING HARDWARE

WINNER: AirDock, Farallon Computing

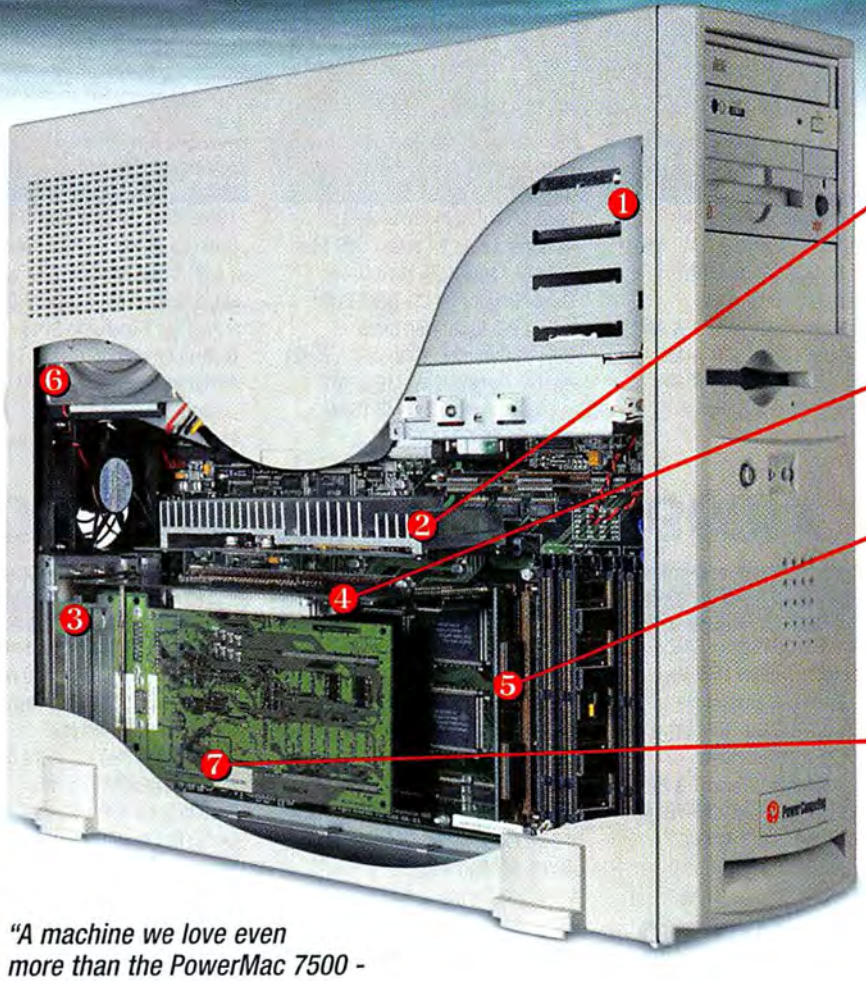
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"A machine we love even more than the PowerMac 7500 - the PowerWave 604"

MW ★★★★ *Macworld- Feb 96*



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Macworld- Aug 95

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Infoworld- June 95



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Quad-Speed (4X) CD-ROM Drive
3 Fast PCI Expansion Slots
Built-in Ethernet (10Base-T & AAUI)
64-bit PCI Graphics w/2MB VRAM
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132 MHz PowerPC™ 604

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Quad-Speed (4X) CD-ROM Drive
3 Fast PCI Expansion Slots
Built-in Ethernet (10Base-T & AAUI)
64-bit PCI Graphics w/2MB VRAM
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PowerWave 604/150 Hot Pick
150 MHz PowerPC™ 604

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512K Level 2 Cache (1MB Max)
1.0GB 11ms SCSI Hard Drive
14 inch .28 DP Monitor
Quad-Speed (4X) CD-ROM Drive
3 Fast PCI Expansion Slots
Built-in Ethernet (10Base-T & AAUI)
64-bit PCI Graphics w/2MB VRAM
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Extended Keyboard & Mouse

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Macworld- Aug 95

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MW EDITORS' CHOICE

"A machine we love even more than the PowerMac 7500 - the PowerWave 604"

MW ★★★★ *Macworld- Feb 96*

PowerWave 604/150 XL
150MHz PowerPC™ 604

32MB RAM (512MB Max RAM)
512K Level 2 Cache (1MB Max)
1.0GB 11ms SCSI Hard Drive
15 inch Sony Monitor
Quad-Speed (4X) CD-ROM Drive
Internal Iomega Zip™ Drive
3 Fast PCI Expansion Slots
Built-in Ethernet (10Base-T & AAUI)
64-bit PCI Graphics w/4MB VRAM
Extended Keyboard & Mouse

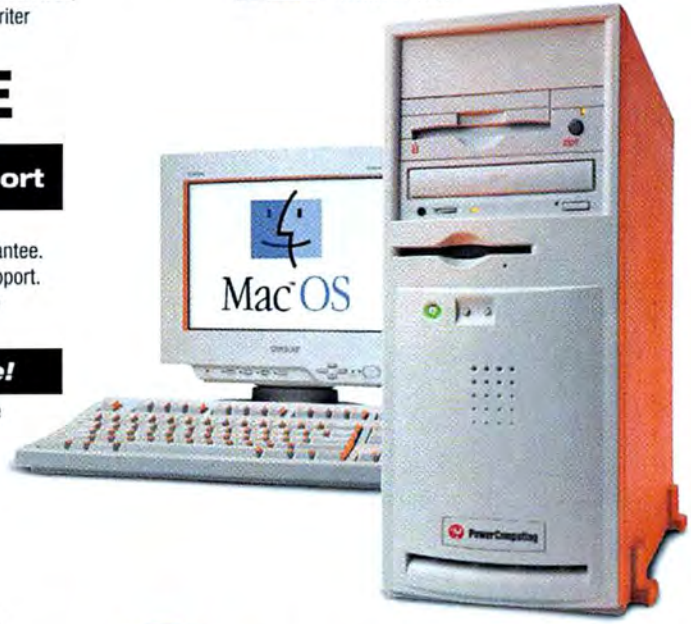
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by Deke McClelland

graphics' great LEAP

A new class of draw programs promises to make illustration software truly easy to use

IMAGINE THAT TO PLAY BASKETBALL, YOU NOT only had to pass, dribble, and shoot, you also had to know the physics of the game. Before making a move, each player had to routinely calculate the path of the ball, the equation of a jump, and the reactive force of the backboard.

Sound preposterous? Maybe, but regular users of Adobe Illustrator or Macromedia FreeHand know what I'm talking about. To create a drawing in those programs, you must accurately place anchor points along the path of a curve, then bend the curve by positioning Bézier control handles. These are the same points and handles Illustrator and FreeHand use to describe the curves to a printer—these programs make no attempt to shield the user from the complexities of the mathematical curve analysis.

As a result, Illustrator and FreeHand don't exactly free the right brain to be spontaneous and do its best work; instead, you must carefully plot out each and every move. Drafters and other technical artists have adapted easily to this structured environment, but traditional artists have had to modify their styles and approaches or stick with pen and ink.

Until now, that is. At long last—nearly nine years after Illustrator first introduced Mac artists to the Bézier curve—a new generation of graphics software is making it significantly easier to draw and edit curves. This new wave of draw programs offers intuitive, easy-to-use tools that could open up the world of computer drawing to dabblers and doodlers, while still providing the sophisticated tools and features required by seasoned illustrators (turn the page to see what some professional artists were able to create using these programs). And they're attractively priced. Each of the five programs I reviewed costs under $300, and the two best—FutureWave Software's SmartSketch and MetaTools' KPT Vector

DON ARDAY

Effects—are both under $200 list, with street prices considerably less.

As good as they are, however, none of these programs are going to take the place of Illustrator or FreeHand. The veteran illustration programs still corner the market when it comes to precision editing, masking, automated gradations, PostScript printing, and a number of other areas. But with their low prices and ease of use, the new draw program contenders are likely to become important additions to the Mac artist's toolbox in their own right.

SmartSketch: Drawing That's as Easy as Painting

Low-end drawing has long been an unsatisfactory and uninspiring category of Macintosh software. Programs such as MacDraw (now ClarisDraw) and Aldus SuperPaint (now an Adobe product) did not simplify the drawing process per se; they just avoided features that might cause confusion. Granted, it was easy to get to first base with these programs, but it was impossible to get any further because the other bases—basic curve-editing functions, for instance—were missing.

The astonishingly affordable SmartSketch ($69.95; street price about $50) departs from this sorry tradition by making complex and powerful functions easy to use (see the table "Drawing Conclusions" for *Macworld*'s Star Ratings on the programs reviewed here). Developed by a group of former Aldus Consumer Division folks—the same people who brought us SuperPaint, in fact—SmartSketch is designed to make drawing as straightforward as painting. To do this, the program approaches drawing the same intuitive way a paint program does, by editing shapes according to what you see on screen.

Consider the example of a figure 8 drawn in Illustrator and then in SmartSketch. In Illustrator, this 8 is an independent object with exactly two PostScript properties: fill and stroke. If you fill the 8 with color, you color both top and bottom loops without filling anything else in the drawing. By contrast, if you draw the 8 in SmartSketch, the program sees what you see: a top loop and a bottom loop that touch in the middle. Click with the paint bucket tool inside the top loop, and you fill only that loop, just as you would in a paint program. Draw across the loop with the same color you used to fill it, and the shape grows to incorporate the brushstroke. You can then select the fill independent of the outline, as if you had clicked on it with the magic-wand tool in Adobe Photoshop. You can even select partial areas of the shape by surrounding them with a lasso tool, again exactly as you would in a paint program.



CUBISM, COMPUTER STYLE Jeffrey Pelo created his homage to Juan Gris with FutureWave Software's SmartSketch.

But make no mistake, SmartSketch is a vector-based draw program through and through (traditional draw programs are vector, or object-based, while paint applications generate raster, or bitmapped, graphics). Among its best features are

• *Easy path reshaping* SmartSketch tracks the location of anchor points and control handles much as Illustrator does; it just doesn't bother you with the details. To reshape a path, you can drag absolutely any spot on the outline. If two shapes coincide at a point, you can drag that point without ever worrying about misaligning the shapes. In fact, to ensure accurate alignment, SmartSketch constantly shifts anchor points around to locations where shapes intersect.

• *Intelligent shape recognition* SmartSketch also offers highly useful, unique shape-recognition and -simplification functions. Clicking on a button converts squarish outlines to exact rectangles and oval ones to ellipses. Another button smoothes rough surfaces. You can also click repeatedly to even out an outline in incremental steps.

• *Fast and fluid painting* In Illustrator and FreeHand, you merge shapes or clip chunks out of them using elaborate path operations. But in SmartSketch, you merely paint on a shape to increase its size or erase part of the shape to gouge holes in it. You can also paint behind existing shapes, paint inside them, or scribble through the fills without harming the outlines.

• *Antialiasing and more* And lest you mistake SmartSketch for an amusing cream puff, it offers 20 levels of undo, multiple pages, and on-screen antialiasing. This last function, which neither FreeHand nor Illustrator offers, is especially helpful for folks who want to edit pixel versions of their vectors in Photoshop. Just take a screen shot of your image (⌘-shift-3) and you're ready to go—no need to rasterize an EPS file.

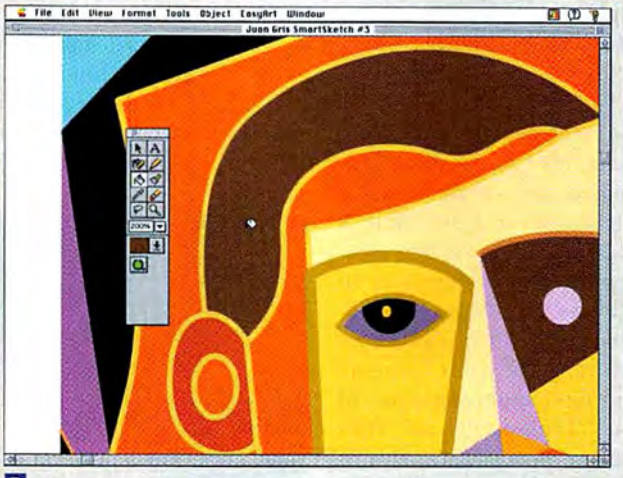
• *Simplicity is the key* I don't mean to imply that SmartSketch is the equal of Illustrator or FreeHand. If you expect it to measure up to either program for drawing structured illustrations, you'll be sorely disappointed. But if you're looking for simplicity and a painterly approach, SmartSketch is right on target. When it comes time to get technical, you can always export the drawing to the Illustrator 88 format and then open it in either of the big two.

As its name implies, SmartSketch is a sketching tool. Novices can use it to cre-

SmartSketch: THE SHAPE OF THINGS TO COME



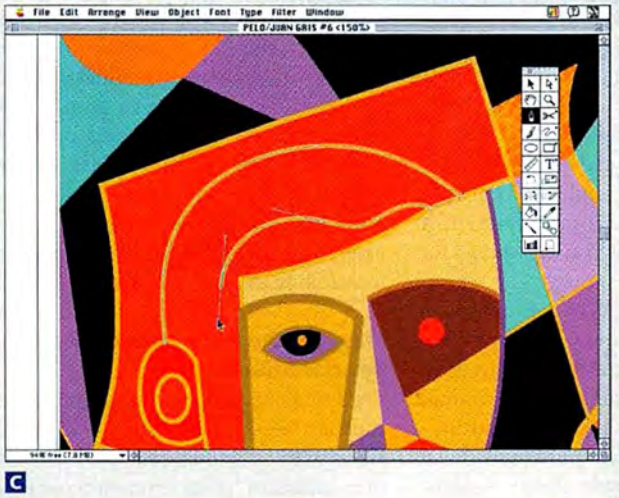
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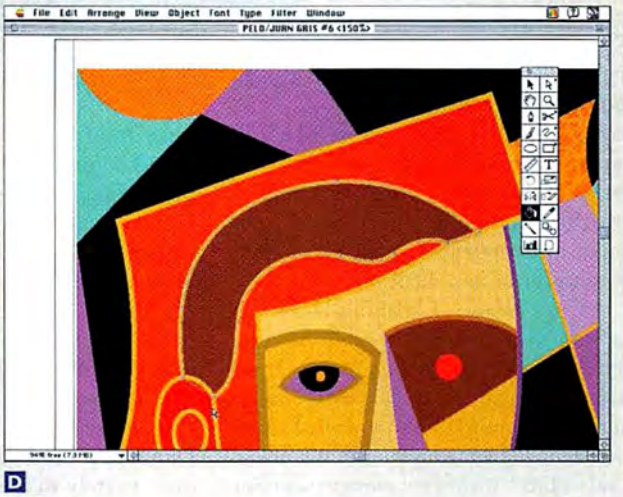
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OPERATING IN THE STYLE OF SYNTHETIC CUBIST JUAN GRIS, Jeffrey Pelo assembled his simple, rhythmic forms inside SmartSketch. Pelo found it easy to segment shapes by painting across them in SmartSketch, as well as to apply different colors to the separated shapes. For example, to create the hair, Pelo drew a line across the forehead with the pencil tool (A), which had the added effect of cutting the top of the head in half. He then filled the top half with brown using the paint bucket (B). To get the same effect in Illustrator, Pelo drew one shape around all the hair, stroked and filled that shape (C), and then cut and pasted it behind the ear (D). The SmartSketch technique involved fewer steps and resulted in a simpler file with fewer paths and no strokes.

Ultimately, though, Pelo had to import the completed SmartSketch drawing into Illustrator, where he assigned process colors to the shapes. "The lack of CMYK and gradations were my biggest beefs with SmartSketch," Pelo said. He also wished there were a button to turn off the program's path-splitting function, so that he could draw a line over a shape without inadvertently slicing it in two. But his overall impressions were favorable. "It's very easy to experiment in SmartSketch," he said. To create the orange and yellow patterns beside the tie, above the neck, and to the right of the head, "I just squiggled inside the shapes with the pencil. SmartSketch automatically cropped the squiggles and made them separate paths." Pelo's most ringing praise: "I've been using SmartSketch quite a bit, and I'm still using it for new pieces. I wish Illustrator offered a sketch mode like this."



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ate finished drawings, and pros can use it to rough out ideas without resorting to autotracing programs. And for the price, I don't see why any artist would want to pass it up. It's an excellent value.

LightningDraw GX: Making the Most of QuickDraw GX

Scheduled to ship by the beginning of 1996, LightningDraw GX puts a simple face on complex reshaping and merging functions (similar to SmartSketch), yet houses the result inside a familiar drawing environment (à la ClarisDraw). The program also makes the most of Apple's QuickDraw GX extension to System 7.5, offering a full range of color-blending and typographic options. In fact, LightningDraw GX's biggest downside is that it requires the resource-intensive QuickDraw GX 1.1 (or later) to run. Without GX installed, LightningDraw GX won't even start up (more on QuickDraw later).

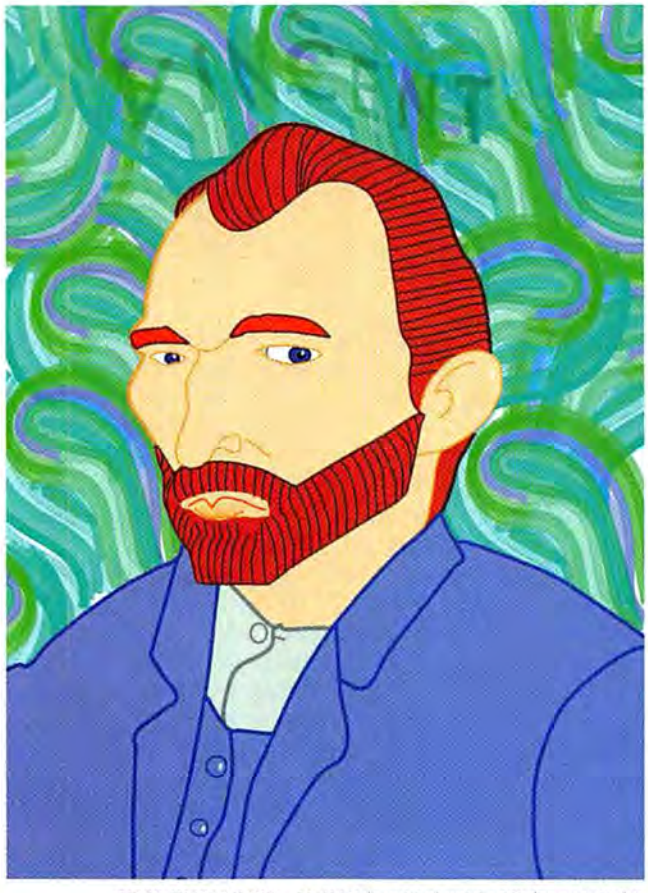
LightningDraw GX does not take the painting analogy nearly as far as SmartSketch but does provide many deceptively simple controls.

• *It's a drag* As with SmartSketch, you can reshape paths by dragging anywhere along the outline. You can even adjust a Sensitivity slider bar to determine how much of the path stretches or shrinks as you drag.

• *Merger mania* Also like SmartSketch, LightningDraw GX lets you merge one brushstroke with another or create a hole by erasing with a brushstroke. Though you have to spend a little extra time telling LightningDraw GX what you want to do—as its name implies, SmartSketch is "smarter" about merging shapes automatically—you can develop complex forms with little effort.

• *Color blends* LightningDraw GX distinguishes itself in the areas of color blending and text effects. QuickDraw-based draw programs such as Deneba's Canvas have long offered so-called transfer modes, which let you mix the colors in one object with the colors in another. But while you could easily create shapes that looked translucent on screen, you couldn't output them to PostScript printers, diminishing the value of transfer modes to approximately nil.

According to Lari Software, this all changes with LightningDraw GX. I was able to get some simple color-blending effects in a prerelease version of the program to print to a PostScript printer, and I even merged colors and shapes filled with gradients. But artist Matt Walton, who also tested a beta version of LightningDraw GX for this article, experienced some major headaches trying to print a graphic with complex color blends that he created in LightningDraw GX (see "First Impressions" on this spread for more information).



FIRST IMPRESSIONS Matt Walton tried out Lari Software's LightningDraw GX for his portrait of Van Gogh.

• *Just your type* When it comes to formatting text, most draw programs provide you with a palette for editing font, type size, style, and other run-of-the-mill character attributes. But in LightningDraw GX, the familiar palette is given over entirely to GX type effects. Assuming you've selected a GX font such as Skia or Hoefler (both included with LightningDraw GX), you can convert numbers to fractions, replace letter combinations with ligatures, create designer small caps, and add end-of-word flourishes. If the font permits, you can customize weight, width, or other variable attributes on the fly with a simple slider bar. Not even Illustrator—which can automatically adjust the weight and width of Adobe's Multiple Master fonts to copyfit headlines—matches LightningDraw's control over designer text effects.

• *Watch your overhead* QuickDraw GX is LightningDraw GX's greatest strength; it's also one heck of a liability. QuickDraw GX is very demanding, consuming 3MB of RAM and requiring you to "enable" your PostScript fonts by running them through a converter, which increases their size by 30K to 60K per style. Few artists are likely to put up with this kind of overhead to use a single app.

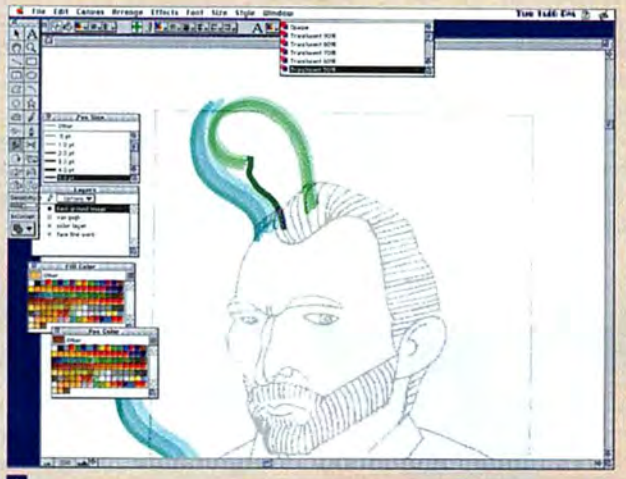
Furthermore, LightningDraw GX provides only one level of undo and can't save to the EPS format, both disadvantages when you compare it with SmartSketch. And at $299 LightningDraw GX's suggested retail price is four times as much as SmartSketch.

While LightningDraw GX promises to be a capable application—more powerful and more inspiring than ClarisDraw, for example—the prerelease version I evaluated does not altogether justify making the GX transition (*Macworld* will review the final version of the software in an upcoming issue). On the other hand, if you've already installed QuickDraw GX and you've come to appreciate its font-handling and printing capabilities, no draw program goes half as far in supporting the technology as LightningDraw GX.

Plug-in Filters: Spontaneity and Special Effects

Traditionally, image-editing applications such as Adobe Photoshop—with their automated color conversions and calculation-intensive, pixel-crunching effects—have held a virtual monopoly on experi-

LightningDraw GX: **LOOKS NICE, BUT WILL IT PRINT?**



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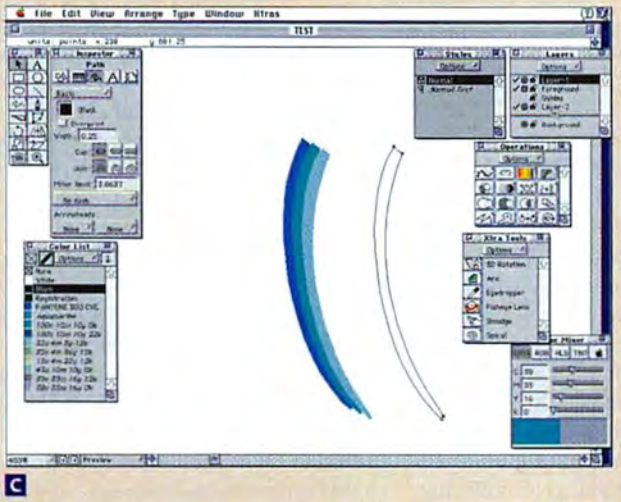
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FOR HIS VARIATION ON VINCENT VAN GOGH, MATT WALTON took advantage of two features unique to LightningDraw GX—QuickDraw GX font effects and translucent paths. Walton found the translucency function particularly useful. To create the paisley groups in the background he layered colored curves on top of one another and applied different levels of translucency to each one (A). After he grouped the curves, Walton duplicated the group several times and applied additional levels of translucency to each group (B).

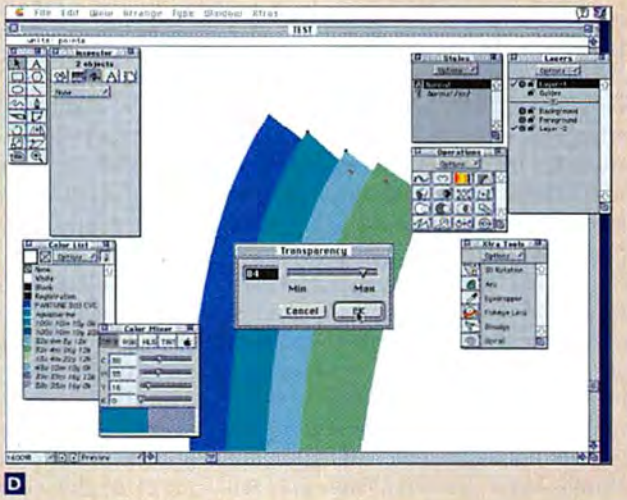
To get the same effect in FreeHand 5.5, Walton had to outline the strokes of the paths first to convert them to closed paths (C). Then he used the Transparency path operation to find the intersection of each pair of overlapping paths and fill the intersection with a combined color (D). "The whole drawing took me 45 minutes in LightningDraw," Walton said. "It would have taken much longer just to do the background in FreeHand. Frankly, I wouldn't have even attempted it."

Walton used a beta version of LightningDraw, and couldn't get the file to print, even to disk. Lari Software (the product's maker) was eventually able to export the drawing as a bitmapped TIFF image, shown here. Lari says the printing problem should be solved by the time the product ships (in early 1996).

Walton isn't ready to integrate LightningDraw GX into his regular regimen but found much to like. He preferred LightningDraw's bezigon tool—the main drawing tool—to FreeHand's pen tool, and he appreciated being able to distort the letters in *Vincent* just by dragging with the smudge tool.



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mentation. Only in the last year or two have Illustrator and FreeHand begun to provide special-effects capabilities, but even these leave much to be desired.

Three recent collections of vector-based plug-in filters—Letraset USA's Envelopes, BeInfinite's Infinite FX, and MetaTools' KPT Vector Effects—promise to bring eye-popping special-effects experimentation to FreeHand and Illustrator. All three are Illustrator-compatible plug-ins that also work with FreeHand 5.0 and 5.5. (Illustrator- and FreeHand-compatible versions of Envelopes are sold separately; one Vector Effects filter—ShatterBox—is incompatible with FreeHand.)

Similar to the Photoshop distortion filters artists take for granted, the three plug-in collections let you stretch, twist, and bend objects. Some filters even add three-dimensional effects and adjust the colors of objects.

Envelopes: Return to Sender Long available to users of the Windows-based draw program CorelDraw, the so-called enveloping technology treats selected objects as if they were printed on a rectangular piece of flexible plastic—sort of like a Sunday comic transferred to Silly Putty. You then stretch the corners and sides of the rectangle to distort the objects inside.

While neither Illustrator nor FreeHand offers this useful function on its own, Envelopes 1.0 is a one-trick pony, and a mediocre one at that. Vector Effects offers an equivalent function called Warp Frame that does the same thing but better. For example, where Envelopes automatically inserts anchor points in roughly equal increments along the outline of a path, Warp Frame adds anchor points only where needed and intelligently adjusts the placement of control handles in between. This results in a much more accurate distortion that's easier to edit later. Envelopes is also more of a problem to use—you can't choose the command from the top of Illustrator's Filter menu to reapply the last effect, for example—and the filter consumes ten times as much space on disk as Vector Effects' Warp Frame. For half the price of Vector Effects—$99 compared with $199—you get a lot less program.

Infinite FX: Falling on Its (Inter)face You can't fault Infinite FX 1.0 for value. Priced at $149, it provides 55 effects. You can rotate control handles around their anchor points, globally adjust the continuity of opposite control handles through their points, project objects onto a sphere or cylinder, and convert curves to straight-sided polygons, just to name a few effects. And you can rotate any effect in 3-D space, even if you can't extrude a shape or add bevels as in Vector Effects.



SAVING TIME Hank Osuna quickly generated the distortion effects in his Salvador Daliesque design using MetaTools's KPT Vector Effects.

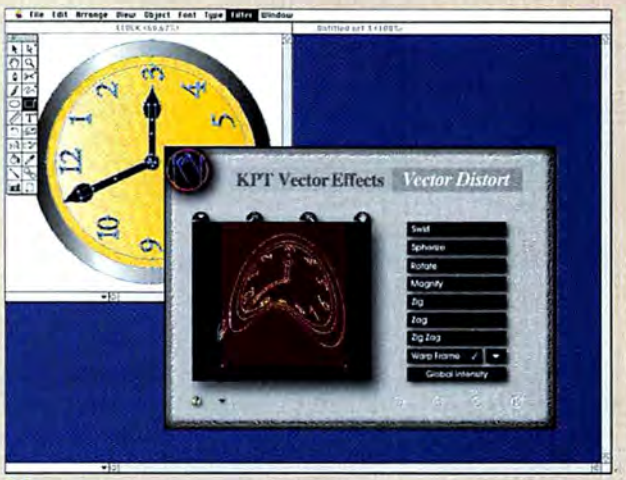
Where Infinite FX fails—and fails miserably—is in interface and organization. First of all, the 55 filters have been dumped into one huge pop-up menu and assigned farcical names like Wiggle Inbound and Balloon Everywhichway. Simply numbering the filters would have served the user just as well. And since none of the effects are documented on paper, you have to select an effect and click on a Help button to figure out what it does. BeInfinite could have eliminated much of this confusion by combining related effects into a single command and using dialog-box options to expound on them. But the one-size-fits-all dialog box that appears for all filters doesn't accommodate check boxes or radio buttons; you can adjust the values in a few option boxes and spin the effect in 3-D space—that's it. If Infinite FX were $15 shareware, this shoddy implementation might be acceptable, but commercial software demands more thoughtful design.

Another problem is that you can't adjust the center of an effect with respect to the selected objects. The Pond Ripples filter, for example, creates a series of waves that emanate from the exact center of the selection whether you like it or not. And finally, the filters depend on the anchor points, a fault shared by Illustrator's insipid native filters. Therefore, doubling or quadrupling the number of anchor points in an object before applying a filter results in a smoother effect. By contrast, Vector Effects filters produce equally smooth results regardless of how many points an object contains. There's some valuable math going on inside Infinite FX; too bad the filters lack an intelligible interface to help users make sense of it.

KPT Vector Effects: An Essential Tool for Artists To say that Vector Effects 1.0 is a more valuable editing tool than Envelopes and Infinite FX doesn't do it justice. Vector Effects is a wonderful collection in its own right, the kind of product every graphic artist should keep close at hand regardless of what else is out there. Organized and well executed, the Vector Effects filters bring key capabilities to both Illustrator and FreeHand. Learn to use them, and you'll wonder how you lived without these filters.

For Illustrator users, Vector Effects includes three filters that mimic enviable capabilities from FreeHand. One lets you numerically position points and control handles, another offers coordinate positioning options, and the third lets you correct the colors of selected objects. Although the control-handle positioning could be better implemented—you can't move two handles together to maintain

KPT Vector Effects: **AUTOMATING THE ART OF ILLUSION**



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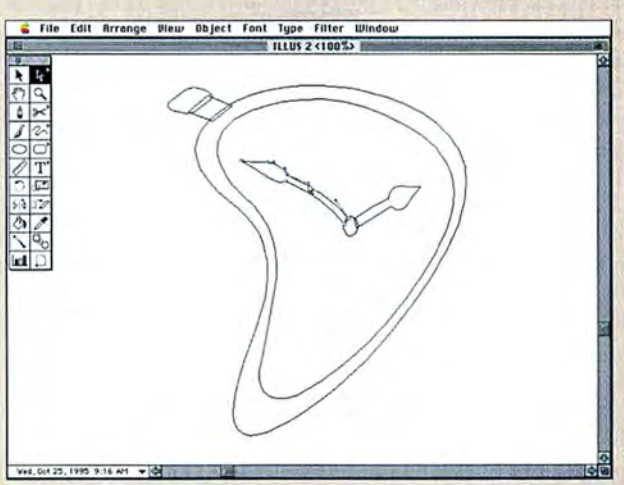
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SALVADOR DALI WOULD HAVE HAD AN EASIER TIME CREATING the sagging clocks in *The Persistence of Memory* if only he'd had KPT Vector Effects to work with, according to artist Hank Osuna. To create the clock in his homage to Dalí's famous surrealist piece, Osuna first drew the clock as an ordinary, flat object using Illustrator's circle and square tools. Then he launched KPT Vector Effects' Vector Distort dialog box, selected a predefined Warp Frame effect, and quickly gave his clock that meltdown look (A).

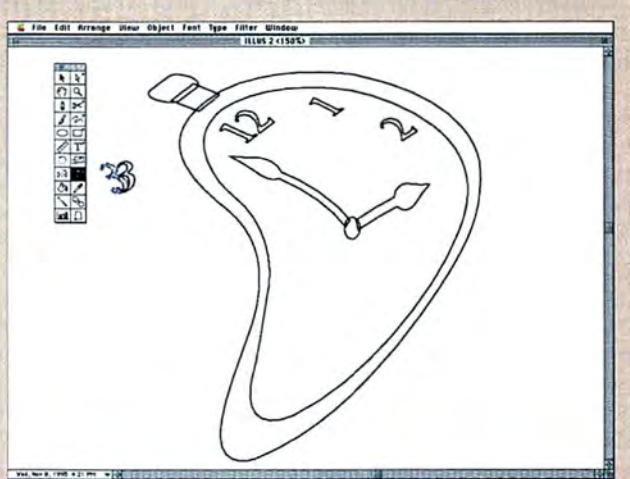
"There was nothing to it. I just experimented with the prefab settings until I got what I wanted," Osuna said (B). Without Vector Effects, Osuna would have had to sketch the warped clock on paper, scan it, and trace it with the pen tool, or draw the distorted timepiece directly in Illustrator (C)—with the help of its shear tool, which skews objects (D). "Imagine if I had to sit there and draw all those distorted numbers. I'd go nuts. Vector Effects is a big time-saver."

Osuna's only problem was the speed of his Quadra 610. "The filters worked fine for simple things, but if I selected a lot of shapes, they took a lot of time to process." Fortunately, he didn't waste any time learning the program. "I still haven't read the manual," he admitted. Osuna particularly appreciated the way Vector Effects allowed him to experiment. After making a few simple objects "all twisted and weird," Osuna found details of interest that he then cropped out and integrated into his work.

"It's a terrific, inspirational program," Osuna concluded. "I've already used it on another job."



C



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DRAWING CONCLUSIONS

	Envelopes	Infinite	KPT Vector Effects	LightningDraw GX	SmartSketch
Company	Letraset USA	BeInfinite FX	MetaTools	Lari Software	FutureWave Software
Star Rating [A]	★★/4.5	★★/3.3	★★★★/8.5	★★★/6.2	★★★★/8.7
List price	$99.00	$149.00	$199.00	$299.00	$69.95
Company's estimated street price [B]	NP	$84.95	$129.95	$180.00	$49.95
Phone	800/343-8973	404/552-6624	805/566-6200	919/968-0701	619/637-6190
Comments	distorts objects but inserts extraneous anchor points as well	offers a wealth of automated reshaping effects; mired down by poor organization	combines excellent experimentation functions with thoughtful interface design	lets you combine colors and shapes and experiment with QuickDraw GX fonts	makes drawing and editing paths as easy as painting

NP = Not provided by company. [A]Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) [B]Actual prices could be higher or lower than the estimated street price provided by the company.

smooth-point symmetry—and FreeHand's palette options are more convenient, Illustrator stalwarts will find much to like. Another filter, ShatterBox, doesn't work with FreeHand at all. This filter fragments shapes and randomly displaces the pieces over a specified distance.

The remaining nine filters are equally helpful to users of either program. Some expedite techniques that computer artists have been performing for years. For example, the ShadowLand filter creates drop shadows and the Neon filter paints neon strokes. You've been able to achieve both of these effects since Illustrator 88 first introduced the blend tool, but the filters automate what are otherwise laborious techniques.

Other filters are unique. The Vector Distort filter combines a collection of shape-distortion effects under one roof, allowing you to add ripples, wrap objects onto spheres, swirl objects, and apply enveloping from a central location. Here's a model for effects integration that even Photoshop could take a lesson from.

Unlike Infinite FX, Vector Effects adopts the keyboard equivalents of the host program so that you can zoom and scroll previews inside dialog boxes without searching through a manual. Vector Effects also provides up to 200 consecutive undos, so you can try out adjustments secure in the knowledge that you can always back up. And all Vector Effects distortions are conservative about their insertion of anchor points and intelligent about their positioning of control handles, a vast improvement over Illustrator as well as other third-party packages. Of all MetaTools' KPT filter collections, I consider Vector Effects the best.

The Last Word

For the past decade, we've seen one vector-based program after another subscribe to the same point-by-point path-construction model that first found its way into Fontographer—designed by the same folks as FreeHand—in 1986. So it comes as an unexpected pleasure that two successful illustration alternatives—SmartSketch and KPT Vector Effects—have emerged in a single year.

SmartSketch lets you rough out paths as easily as applying brushstrokes in a paint program, and Vector Effects lets you distort and color-correct your paths as simply as applying a filter inside an image-editing application. Best of all, you can own both programs for under $300 retail, less than half the suggested retail price of either Illustrator or FreeHand.

Other alternatives are less successful. Though LightningDraw GX looks to be a solid draw program that simplifies the path-editing process and adds a few useful tricks of its own, its reliance on QuickDraw GX may limit its appeal among professional artists and designers who don't want to put up with the GX overhead and who dearly need cross-platform compatibility (QuickDraw GX is a Mac-only environment). The Envelopes filters package is simply too little for too much—for more money than SmartSketch, you get a moderately capable distortion function. Infinite FX is sufficiently cryptic and convoluted that most artists will be hard-pressed to find a use for it.

Still, it's refreshing to see all this energy directed toward simplifying the creation and manipulation of Bézier paths. I just hope Adobe and Macromedia won't merely sit by and watch as smaller applications and plug-ins take the lead in ease of use (at press time, neither company had revealed plans for the simple interface and natural tools of, say, SmartSketch). With casual users and professionals alike spending more and more time in comparatively straightforward programs like Photoshop and Fractal Design Painter, draw-program developers need to recognize that it's high time paths became easier to negotiate. After all, artists want to draw with the fluid movement of a Michael Jordan—not the brow-furrowing concentration of an Albert Einstein. ■

Contributing editor DEKE McCLELLAND's books include *The Illustrator 6 Book* (Peachpit Press, 1996) and *Macworld FreeHand 5 Bible* (IDG Books Worldwide, 1995).

NATURAL DRAW PROGRAMS

MW EDITORS' CHOICE When evaluating the new generation of draw programs, look for ease of use and the quality of the final results. Two programs win high points in both areas.

★★★★/8.7 **SmartSketch 1.0** If you can drag a paintbrush across a screen, you can use SmartSketch. Even for professionals, this program is an ideal sketching tool, supplying all of the immediacy Adobe Illustrator's pen tool lacks. **Company:** FutureWave Software. **List price:** $69.95.

★★★★/8.5 **KPT Vector Effects 1.0** This collection of Illustrator- and FreeHand-compatible plug-ins contains filters that are both obvious in purpose and easy to apply. **Company:** MetaTools. **List price:** $199.

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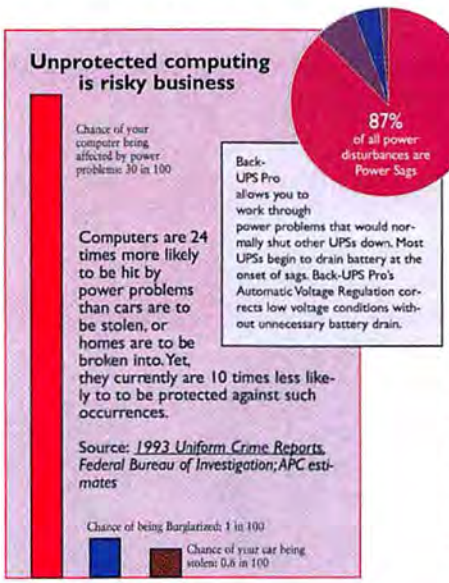
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CLOCKWISE: "After 13 plus years in the computer industry (with both Apple and Digital), I have changed directions and now live in the Santa Cruz mountains, where the power is as bad as the view is beautiful," says Harald Striepe. "Now I spend most of my time consulting and writing fiction. The power is the worst during rainy season and brownouts are a daily occurrence. But, not a problem for me since I got my Back-UPS Pro with AVR - now, I work through the rainstorms."

"I am the Product Development manager for Radio Flyer," says Antonio Pasin. "But quite often, I work at home, where I pay for all the equipment....my TV has been zapped in the past (it turned GREEN!). Here, I don't have an extra $1200 to replace the DAT tape backup...an investment in APC is more cost effective for me. But besides just protecting the hardware, I look it it as protecting my media...I have lots of time invested in my data, and Back-UPS Pro protects that as well. Not to mention the unit is well-designed, easy to use, and APC provides great customer service to boot."

"I am a graphic designer/illustrator, using mostly 9500/132 and 8100/80 PowerMacs, in central Florida, the lightning capital of the world," said Thomas Sessions of Sessions Design in Orlando. "We lose power on a weekly basis and have constant outages....I've used APC for at least 8 years, but Back-UPS Pro is my current favorite - it has a smaller footprint and I can plug in my modem. Before UPSs, when we heard a thunderstorm, you would just hurry and try to get the work done, then just shut down- unplug the machines and take a break....now I wouldn't work without one....particularly in this deadline oriented industry."



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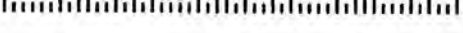
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MacWEEK

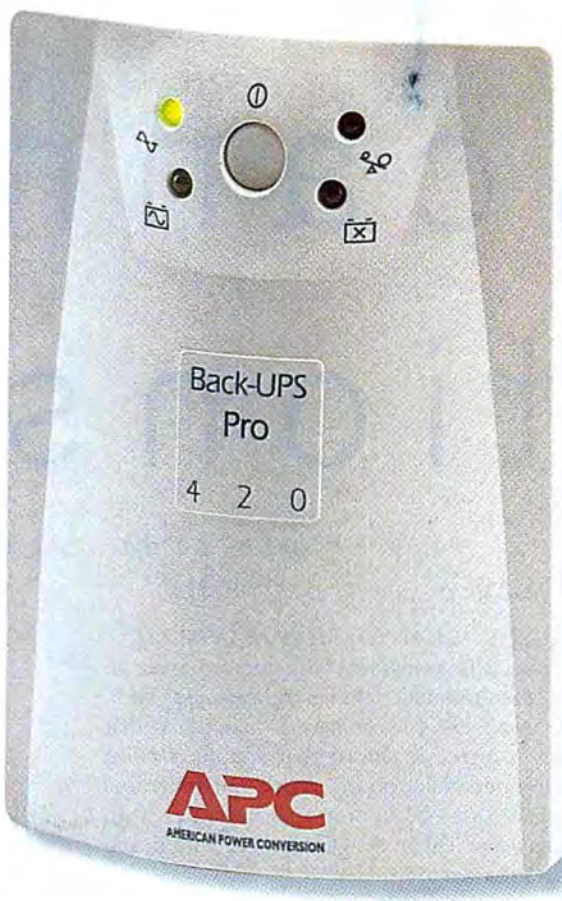
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Back-UPS: Basic Mac Protection Perfect for Performa

Model	VA Rating	List Price
Back-UPS 200	200	$119
Back-UPS 280	280	$139
Back-UPS 400	400	$199
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Circle 72 on reader service card

Is the new breed of low-cost scanners up to the challenge of no-compromise color?

MW LAB

scanner solutions

by Peter M Stoller

DON'T YOU WISH YOU HAD A BOX THAT could magically transform any picture into an editable Macintosh file, right before your eyes? Well, for as little as $499, you can have a "magic box" that promises to make it almost that simple: a color flatbed scanner. Color photos, black-and-white line art, pages of text—heck, even transparencies, with an adapter—put 'em on the glass, press a button, and presto! It's in there!

Yes, it is that simple—almost. The process by which this transformation happens is anything but simple, however. A scan is only a digital approximation of the original picture, after all. Details get lost or blurred, while interpretations of colors and text are inexact. Still, the best scanners do yield impressive results; they combine minimal loss and inaccuracy with maximum power and ease in compensating for the distortions.

The practical applications for color scanners are growing, from desktop publishing to Web publishing to multimedia presentations. With improvements in hardware and software quality on the one hand, and prices dropping nicely on the other (three years ago, 300-dpi, 24-bit scanners cost $500 to $1000 more than they do now), a color scanner might just be your next peripheral buy.

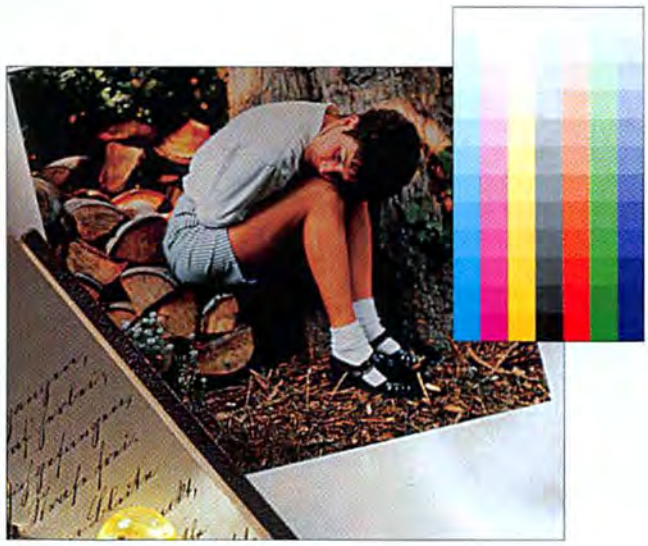
KEVIN CANDLAND



Get Pixelated Umax's Gemini D-16 (top) and Nikon's ScanTouch AX-1200 (middle) are solid performers, but our bottom-line recommendation for all-around price and performance is the Epson ES-1200C (bottom).

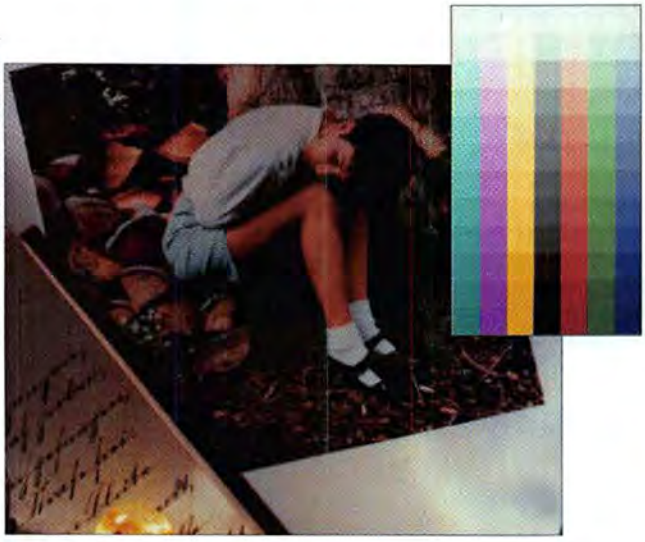
Scanning for the Best Highlights

GET REAL—THAT'S WHAT YOU WANT A SCANNER TO DO, RIGHT? Reproduce an image as closely as possible to real life. To test this, we input both a composite image and the IT8 color-calibration swatch, and then compared the results with a Matchprint from a $100,000+ Crosfield drum scanner (top, left). We were most impressed by the results from the Epson and the Nikon scanners (top, middle and right). We picked the Ricoh scanner (bottom, left) to represent the average result—images that came out dark. The Microtek scanner (bottom, right) goes in the opposite direction—it's really bright, but note how washed out the yellow marble appears.

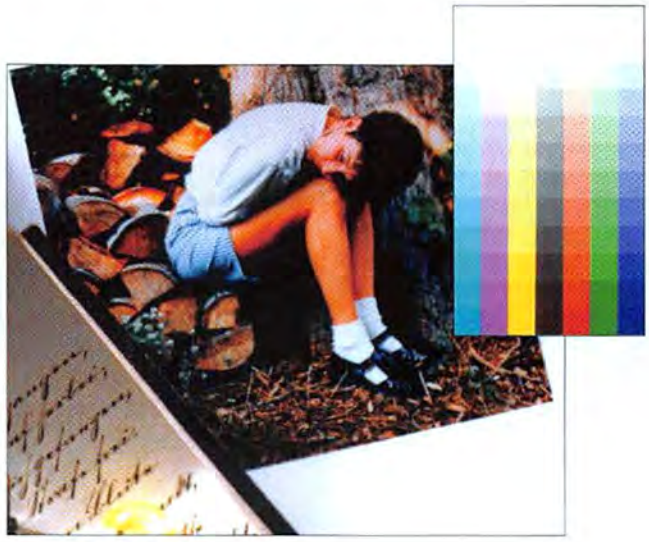


Crosfield Magnascan Plus

PHOTOGRAPHS BY MARK JOHANN



Ricoh CS-300



Microtek ScanMaker IIsp

Ah, but which scanner will it be? To help you decide, we examined a dozen current models with street prices from about $500 to $1700. Macworld Lab tested them for image quality and speed, and then checked the software for power and ease of use. Did we find high-end prepress quality for $500? Nope. But we did find that, with some tweaking, you can get darned good scans at a darned good price.

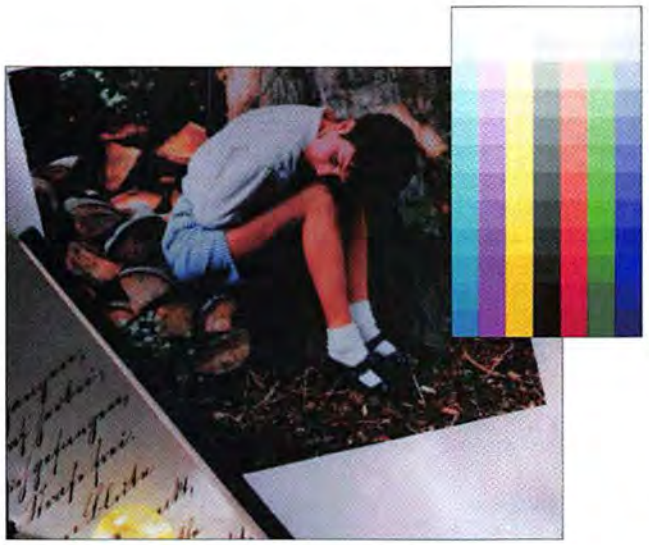
A Bit about Bits

Out here in the real world, shades of color and gray are continuous. Computers are in another world; because they work with bits, they must break down the spectrum into discrete levels. A 24-bit scanner divides each of its three primary colors—red, green, and blue—into 8 bits, or 256 levels. (In gray-scale mode, a 24-bit scanner captures 256 levels of gray.) This (256^3) gives you 16.7 million possible combinations, that is, 16.7 million colors.

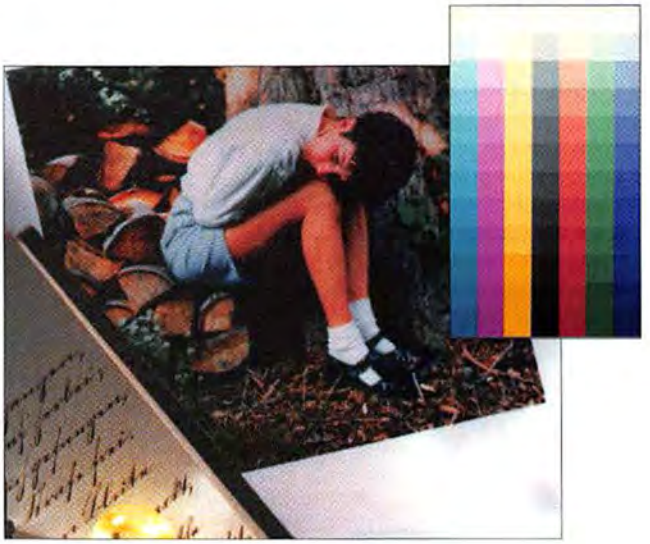
Theoretically, that ought to be enough data for a great picture. Unfortunately, it's not all good data; when you reach the 7th and 8th bits, accuracy takes a nosedive, resulting in lost or distorted details, especially in highlight and shadow regions. Furthermore, when you apply tonal corrections—adjusting gamma-curve results, brightness, and contrast—you reduce the size of your color palette, resulting in lost data; you can change the colors you've still got, but you cannot work with what isn't there.

The solution seems pretty obvious: add more bits. That's exactly what most of these companies have done. All but the Apple, Canon, Microtek, and Ricoh units (four of the least expensive products) are 30-bit scanners. At 10 bits per color, they capture 1024 levels of red, green, and blue, for over a billion colors total. The first 8 bits are fairly accurate, so the scanner can just junk the last couple of bits and leave you with superior 24-bit color.

More significant, if the scanner performs tonal corrections of color in hardware, you can take real advantage of the greater number of colors. When you expand part of the tonal range of a 24-bit image—say, to bring out shadow details—you compress it elsewhere, losing midrange and highlight details. A 30-bit scanner can use your instructions to select and deliver the best, full 24 bits of data for your needs, giving your corrected image much smoother tonal continuity and greater detail retention.



Epson ES-1200C



Nikon ScanTouch AX-1200

True Colors

So, these 30-bit scanners have the potential to capture colors more accurately. But do they deliver? Yes and no. There's no question that they have an improved dynamic range—they capture gray and color levels more accurately (see the benchmark "Scanning for Speed"). And in our gray-scale sensitivity test results, the 30-bit scanners (save for the Mustek Paragon 1200SP and Tamarack ArtiScan Z1-600) easily sweep the top spots.

Color accuracy is more complicated than just capturing levels, though. There is no single, perfect model for accurately translating analog colors into the digital world and back again. Every scanner compensates for this inadequacy differently, which means they interpret colors differently . . . and inaccurately. We checked how inaccurately by scanning a color-calibration target, then using highly sophisticated color-measurement equipment to compare the scans with the original target. You can see the results in the benchmark "The Best Color with the Least Noise," but the problems are quite clear to the naked eye (see the sidebar "Scanning for the Best Highlights").

In all cases but one, the scanners erred on the dark side. They also had the biggest problems with the most saturated colors, including the darkest colors. This is visible as a loss of shadow detail. If the loss of detail is not too extreme, you can compensate in your scanning software or image-editing program. The Epson ES-1200C, for example, was sufficiently close for us to bring it into line with minimal difficulty. In the worst cases, though, such as with the La Cie Silverscanner III, recovering shadow detail was an unrewarding chore.

Just from looking at the numbers, one would think the Microtek ScanMaker IIsp nated it our Editors' Choice, though, when we took into account the quality of its output along with its overall price.

MW LAB Scanning for Speed

Best overall scan time.
Products are listed in alphabetical order.
Times are in seconds. Shorter bars are better.

When we clocked the scanners on their default settings for color and gray-scale scanning, the Epson ES-1200C was in the middle of the pack. We desig-

	Bundled Software	Gray-Scale Scan: Preview Time	Gray-Scale Scan: Scan Time	Color Scan: Preview Time	Color Scan: Scan Time
Agfa StudioScan IIsi	Photoshop plug-in	15.7	25.2	26.8	60.6
Apple Color OneScanner	Ofoto 2.0	46.6	57.3	47.3	59.2
Canon IX-4015	Photoshop plug-in	10.2	34.4	10.9	44.9
Epson ES-1200c	Photoshop plug-in	8.3	27.8	21.4	93.4
Hewlett-Packard ScanJet 4c	HP DeskScan II	17.3	19.0	18.0	77.7
La Cie Silverscanner III	Photoshop plug-in	6.0	27.3	12.1	94.8
Microtek ScanMaker IIsp	Photoshop plug-in	20.3	13.1	24.2	67.8
Mustek Paragon 1200SP	Photoshop plug-in	6.0	28.0	5.9	99.6
Nikon ScanTouch AX-1200	Photoshop plug-in	9.6	36.2	17.1	86.3
Ricoh CS-300	Photoshop plug-in	14.9	14.4	61.1	73.3
Tamarack ArtiScan Z1-600	Photoshop plug-in	9.6	19.6	13.5	52.2
Umax Gemini D-16	Photoshop plug-in	14.5	32.5	14.4	38.8

BEHIND OUR TESTS

We performed all tests using each scanner's default settings (with additional settings that gave the best color accuracy). We tested the scanners with a Power Macintosh 7100/80 with 40MB of RAM and a 700MB internal hard drive. We used an Apple 16-inch display with bit depth set to 24. We allocated extra memory to Adobe Photoshop 3.0 to hold disk access to a minimum.—**Macworld Lab testing supervised by Mark Hurlow and Jeff Sacilotto**

Cool Color Tools

Company	Scanner	Star Rating*	List Price	Company's Estimated Street Price	Phone	Maximum Scanning Area (in inches)	Optical Resolution (in dpi)	Maximum Bit Depth	Warranty (in years)
Agfa	StudioScan IIsi	★★★/5.9	NP	$900	508/658-5600	8.5 x 14.0	400	30	1
Apple Computer	Color OneScanner	★★/3.3	$859	$859	408/996-1010	8.5 x 14.0	300	24	1
Canon	IX-4015	★★/3.8	$799	$730	714/438-3000	8.5 x 11.7	400	24	3
Epson	Editors' Choice ES-1200C	★★★★/7.2	$1299	$1000	310/782-0770	8.5 x 11.7	600	30	2
Hewlett-Packard	HP ScanJet 4c	★★★/6.1	$1175	$995	208/396-2551	8.5 x 14.0	600	30	1
La Cie	Silverscanner III	★★★/5.6	$1499–$1699**	$1499–$1699**	503/520-9000	8.5 x 11.7	600	30	1
Microtek	ScanMaker IIsp	★★★/5.0	NP	$499–$699**	310/297-5000	8.5 x 11.7	300	24	1
Mustek	Paragon 1200SP	★★/4.0	$899–$1000**	$799–$1000**	714/250-8855	8.5 x 14.0	600	30	2
Nikon	ScanTouch AX-1200	★★★/5.8	$1720	$1200	516/547-4355	8.5 x 14.0	600	30	1
Ricoh	CS-300	★★/3.1	$599	$499	408/954-5326	8.5 x 11.0	300	24	1
Tamarack	ArtiScan Z1-600	★★/3.3	$649	$569	714/744-3979	8.5 x 11.0	300	30	2
Umax	Gemini D-16	★★★★/7.1	$1895–$1995**	$1595–$1695**	510/651-4000	8.5 x 11.7	400	30	1

*NP = Not provided by company. * Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) ** Price depends on*

had color accuracy nailed. The ScanMaker, however, is the exception: it erred on the light side of the gamut. True, the colors it captured were very close to the test target, and we easily adjusted them to be nearly identical. However, the problem is with the colors it didn't capture. The ScanMaker IIsp lost a whole range of highlight colors, blowing them out to white. Nothing we could do would make it capture highlight detail.

Between those two extremes lie the "fixable" problems. Yet, again, the numbers don't tell the whole story; some types of color errors are easier to correct than others, even when similar in degree. For example, it's fairly simple to adjust for consistently dark colors or an even color cast, but it's hard to correct reds that are too orange without distorting accurate greens. We found that the Nikon and Umax scans were easy to fix, while the Tamarack and Mustek scans weren't. Because such editing can be a lot of work, and you always run the risk of introducing worse problems than you fix, initial color accuracy matters.

Resolving Questions of Resolution

Scanner vendors toss all sorts of numbers around when they talk about resolution: "Up to 4800 by 4800 dpi interpolated!" Forget about it. The only numbers that count are those for optical resolution; that's the level of detail the scanner's hardware really captures. Interpolation means the scanner or scanning software is generating data based on the real, captured data. That may smooth jaggies in line art, but it won't add a lick of detail.

Even the optical resolution figures can be misleading: "300 by 4800 optical!" The first number is the horizontal resolution—that's the scanner's true optical resolution. The second number is the vertical resolution, which is (surprise) interpolated. Whether it's 300 by 300 or 300 by ∞, you've got a 300-dpi scanner.

Comments
The StudioScan IIsi gets good performance from its 30-bit, 400-dpi engine. Agfa's software is powerful and flexible, but could be easier to use.
The Color OneScanner's anemic software bundle and lackluster performance would make it an unexceptional offer even if reasonably priced.
The IX-4015 boasts desk-space economy and an exceptional warranty, but its performance and software bundle are mediocre.
The ES-1200C has great image quality, respectable speed, and good software, all at a reasonable price.
The HP ScanJet 4c is a respectable performer in all categories, though not exceptional. Limited software is its greatest weakness.
The Silverscanner II is a good performer in many respects, but its poor color accuracy and high price place it behind the Epson ES-1200C on which it's based.
The ScanMaker IIsp is a shaky performer at best, especially when it comes to capturing highlight detail (it doesn't), but it's an option for the bargain hunter.
The Paragon 1200SP is a disappointment, from its performance to its bare-bones manual. Proof that a 600-dpi, 30-bit scanner for $799 isn't a bargain.
The ScanTouch AX-1200 is a solid performer, but at this price it should be closer to stunning.
The CS-300 has one thing going for it: It's dirt cheap. Unfortunately, with performance, software, and documentation this weak, it's still overpriced.
The ArtiScan Z1-600's poor software, manual, and scanning performance make it hard for us to recommend it, even at its low price. So we won't.
The Gemini D-16 is unique in being both a 400-dpi and 800-dpi scanner, depending on the scanning area. But for several hundred dollars above its competitors, you'd better need that extra resolution.

bundled software.

So, how important is optical resolution? It depends on what sort of work you're doing. If you're scanning photos for a Web page or for output to an ink-jet printer, a 300-dpi scanner will capture more detail than you'll ever need. But if you're printing to high-resolution output devices, blowing up small originals, or reproducing line art, you should be looking for a 600-dpi or better scanner.

We found that, even at lower resolution settings, scanners with higher optical resolutions fared better at capturing details. Testing at 300 dpi, the 600-dpi and better scanners easily bested the 400-dpi and 300-dpi scanners, with Epson, Nikon, and Umax running win, place, and show. Weakest were the Ricoh, Apple, and Canon scanners.

Resolution is also critical for optical character recognition (OCR): converting scanned documents into editable text. However, in previous testing we've found that, even with higher-resolution scanners, OCR programs are too inaccurate to be practical for more than occasional use. Thus, we don't recommend buying any scanner primarily for OCR.

Loud and Fast

Another problem with scanners is noise. No, not sounds you can hear, but random distortion in your scanned images; spurious specks of color. Still, if you could actually hear this noise, you would want your neighbors to buy a Hewlett-Packard ScanJet 4c, La Cie Silverscanner II, or Epson ES-1200C. You might bang on the pipes if they used their Microtek ScanMaker IIsp after 11 p.m., though; it introduced the most noise into its scans (see the benchmark "The Best Color with the Least Noise").

OK, you don't want a noisy scanner, but you do want a fast one. The more scans you do, the faster you want your scanner to be, and the more prescan editing you do, the faster you want previews to be.

Fast previews are especially important. Scanner software gives you a quick, low-resolution preview of approximately how your high-resolution scan will look. Most scanner software also lets you apply filters and tonal corrections at this point to reduce the amount of postscan editing in your graphics program, and (as discussed above) to make the best of 30-bit hardware. Also, by testing corrections on a low-res image, you can work more quickly than with a final scan.

Most of these scanners are reasonably speedy performers on both scans and previews, with the Umax and Canon (using the Photoshop plug-in) being the fastest for color work. The Nikon ScanTouch AX-1200 and the Ricoh CS-300 offer fast preview modes if you are scanning in gray-scale, but they also hinder prescan editing because they present either lower-resolution or gray-scale–only previews. Meanwhile, the Agfa StudioScan IIsi rescans whenever you edit the preview, defeating the timesaving function of prescanning.

The real clunker, though, is the Apple Color OneScanner using LightSource Ofoto's AutoScan mode. It took four minutes to do a gray-scale scan, and it refused to complete our color scan because it couldn't automatically straighten the image. Even in manual mode, prescanning was snail-like.

Software Plugged In

We've covered the quality of the raw image data and the speed with which you can get it. Just as critical is the ability to manipulate data as you scan it in: what can you do and how easily can you do it? That's where scanning software comes in.

The best scanning software lets you resize, zoom, and edit previews quickly and easily, and lets you control gamma curves and the white point, midpoint, and black point graphically and by plugging in numbers. The best software also offers a densitometer, measures color values and displays a histogram for viewing and editing tonal ranges, offers sharpness controls, prevents moiré patterns in scans of previously halftoned images, and includes color-management software to help with input/output matching.

Agfa's FotoLook has a complete, powerful set of tonal-correction tools, and it takes full advantage of the 30-bit hardware. If only the tools were easier to use and more clearly documented. Agfa also includes FotoTune Light, a basic color-management system; FotoFlavor, a flexible Photoshop filter plug-in; and FotoSnap, a vastly simplified version of FotoLook.

Umax's MagicScan and MagicMatch software are comparable to Agfa's software in power and are easier to use. The tools closely parallel Photoshop's, so the learning curve is low for experienced Photoshop users.

Despite the ScanMaker IIsp's problem with highlights, Microtek has gotten the scanner software interface right with its new ScanWizard plug-in. All the critical features are there, easily and intuitively accessible and well documented.

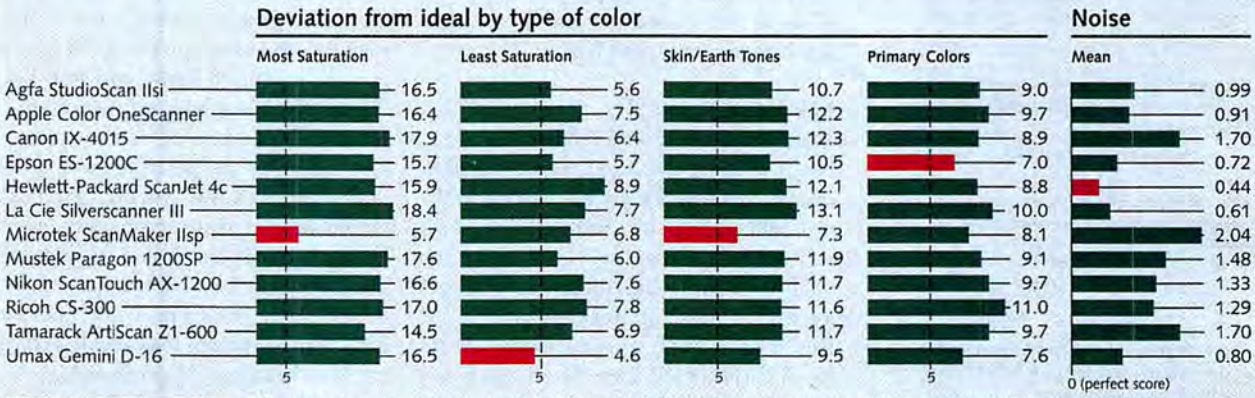
Epson includes Second Glance Software's ScanTastic ps, another fine scanning package. The cute icons take a bit of getting used to, but once you adjust, ScanTastic is a powerful program. Its biggest flaw is a histogram too small to be very useful.

La Cie's software comes close to the mark, but it's marred by a cluttered interface and overlapping functions in different parts of the program. We've heard

The Best Color with the Least Noise

Best in test. Products are listed in alphabetical order. Shorter bars are better.

Finding the ideal color match—even using an industry-standard color-calibration tool—isn't easy. The numbers here show each scanner's variation from the ideal. The lower the number, the less variation from the ideal. Most users won't notice a difference below 5. As for noise, any time you digitize an image, the scanner can unfortunately distort the image through electronic interference. The scanner's own amplifiers or CCD array can interfere with the scanning, as can random fluctuations in scanner light. This can be a problem if you're scanning images with minute changes in color, or if you need to sharpen your images once they're scanned. Here the Hewlett-Packard ScanJet 4c gave the "quietest" performance. For additional test results from these color scanners, access our Web page at *http://www.macworld.com.*



BEHIND OUR TESTS

For our color tests, we scanned the industry-standard color-calibration tool, an IT8 swatch, which contains over 200 patches of carefully selected colors. We also measured each patch with Lightsource's Colortron Spectrophotometer, then measured the RGB values from each scan using Spectrum Analysts' IP Lab software. The RGB values were then converted to CIELAB values using the Colortron application. Finally, we compared the numbers in the uncorrected scans with the ideal.

To measure noise distortions, we made two scans of one image, five minutes apart. We applied the difference calculation in Photoshop, yielding a new file. From the histogram of the new file we extracted the mean. A "perfect" scanner would introduce no noise and deliver a mean of 0.—**Macworld Lab testing supervised by Mark Hurlow and Jeff Sacilotto**

complaints about Hewlett-Packard's lack of a Photoshop plug-in, but we had no problems using HP's TWAIN driver. (TWAIN is a driver standard from Hewlett-Packard that companies use to create their own drivers.) Too bad the Silverscanner II lacks a comprehensive set of tonal-correction tools.

Apple's and Canon's scanners come with Ofoto, a program that excels at automated image correction but has frustrating limitations in manual operation. Apple stops there: no plug-in or TWAIN driver. Canon also includes a Photoshop plug-in, but it seems like an afterthought. Still, it's better than the plug-in that comes with the Ricoh and Tamarack scanners; a tiny, nonresizable preview window with awkward controls, no autoadjustments, no sharpness filter, no progress bar, and inadequate documentation. Mustek's plug-in is better—but not by much.

Some vendors offer enticing bundles. Most of them include an image-editing program such as MicroFrontier Color It or Adobe Photoshop LE (a limited edition of Photoshop lacking several print-related features). Other vendors include the full version of Photoshop, and several offer a choice at two different prices. The only scanner that comes with no image-editing software is the Ricoh CS-300. Other extras range from OCR programs to Kai's Power Tools; these are useful, but not a determining factor when scanner shopping.

The Last Word

The less expensive scanners didn't strike us as real bargains. The Canon IX-4015 boasts desk-space economy and an exceptional warranty but hasn't enough else to recommend it; Apple's Color OneScanner costs more and offers less. The Microtek, Mustek, Ricoh, and Tamarack scanners were simply underwhelming, although Microtek's Photoshop bundle is so cheap, it's tempting to buy the package for Photoshop and think of the scanner as a $100 extra.

While several of the other scanners performed well in our tests, it was not hard to pick a winner. The Epson ES-1200C gets our nod. The La Cie Silverscanner III is based on the Epson engine, but given the Silverscanner's poorer performance, La Cie's changes don't impress us. It should've left well enough alone. The Umax Gemini D-16 ran neck-and-neck with the Epson in performance but can't compete on value.

The Epson ES-1200C has the best image quality, respectable speed, and good software, all at a reasonable price. If you don't need the software, you can get the scanner without it for even less. m

PETER M STOLLER is a consultant to America Online's Macintosh Operating System forum.

MIDRANGE SCANNERS

MW EDITORS' CHOICE We looked at color accuracy, resolution, software, and price when we compared color flatbed scanners.

★★★★/7.2 **ES-1200C** This 600-dpi, 30-bit color scanner offers the best balance of performance, package, and price of all the scanners in our survey. Yes, there are a few scanners for about half the price, but that doesn't make them a better deal, and even the pricier units didn't outperform the ES-1200C. **Company:** Epson. **List price:** $1299.

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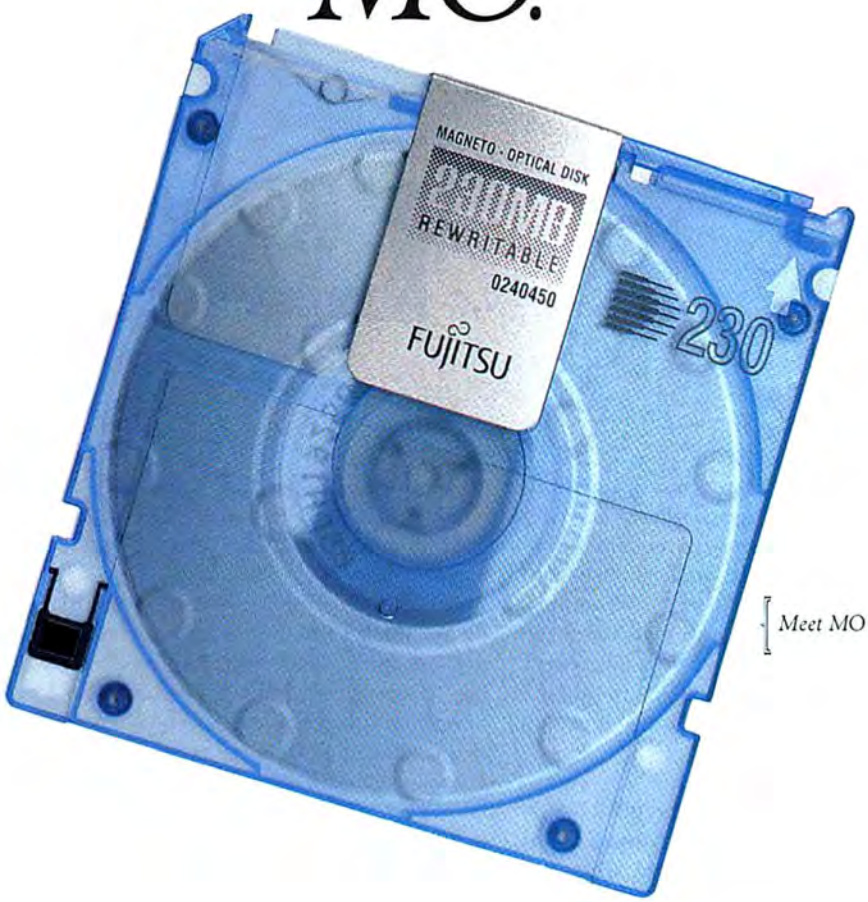
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ETHERNET IN THE FAST LANE

A popular adage has it, "You can never be too rich or too thin." In the world of networks, you would add the corollary, "and your network can never run too fast." Macintosh users are always looking for faster networks. Unfortunately for Macintosh managers, building a fast network is no simple matter—you must understand what affects network performance before you can determine the right approach to speeding it up. If your network is running out of steam, or if, wisely, you're looking toward the future, study the situation and plan carefully before jumping on the latest technology bandwagon.

Network hardware vendors are offering hot new equipment to boost network performance. 100BaseT, 100VG-AnyLAN, ATM, and FDDI all promise speeds of 100 Mbps or higher—ten times the potential speed of today's Ethernet networks—but bandwidth is not usually the limiting factor on network performance. The culprits, in many cases, are overburdened servers, slow clients, inadequate segmentation, or poor network software—or some combination of those.

As a result, money and effort spent on tuning your 10-Mbps LAN may offer greater dividends than faster hardware. Before installing new high-speed LAN hardware, tune up all other areas of your network and be certain that the speed of the wire really is the limiting factor.

This doesn't mean that no networks can benefit from the new high-speed network technologies. Newer workstations, such as the PowerPC-based Macs, and some multimedia applications can stretch the limits of 10-Mbps Ethernet. Network managers who are planning for growth should also consider 100-Mbps—or faster—network hardware. As costs drop, it makes sense to build a high-speed backbone, even if your network doesn't need the speed right now.

What Makes Fast Nets Fast?

High-speed networks running at 100 Mbps or faster have three advantages over standard Ethernet. First, and most obvious, the speed of the network itself is higher. If your workstations can handle more data than a 10-Mbps Ethernet connection can carry, as most newer Macs can, increased bandwidth will eliminate the network bottleneck.

Second, because a 100-Mbps network's signaling speed is higher, it takes less time to transmit and receive a packet. Some network applications, such as AppleShare, do a lot of ping-ponging between client and server—that is, sending status information about their readiness to send or receive packets and so on. By speeding up the ping-pong information, a faster network will get snappier response times from the same slow network apps.

Third, a 100-Mbps network can support more nodes without slowing down, because each node requires a smaller percentage of the network's bandwidth. Although you would be better off using bridges, routers, or switches to segment a congested network, some networks are just hard to segment. For example, a large campus network with clients accessing servers in a centralized facility is difficult to break into pieces that make sense. A 100-Mbps LAN can take the load off such a network.

Network Tuning: Three Questions

Before you run out and swap all your 10BaseT hardware for 100-Mbps equipment, ask yourself three questions. The answers, combined with the performance data you should be collecting (see the sidebar "So How Fast Is Your Network, Anyway?"), can help you determine whether you will derive maximum benefit by upgrading to 100 Mbps.

Is software the problem? Software can be a major drag on networks, particularly on Macintosh ones. AppleTalk itself, the widely used Apple-supplied network protocol, is designed to run over slow networks like LocalTalk and presents a huge barrier to network performance. Application software not designed for network use may treat remote disks as if they were attached locally, reading and writing very inefficiently. Even network-aware software, such as E-mail, often behaves poorly.

BY JOEL SNYDER

HOW—AND WHEN—YOU SHOULD UPGRADE TO THE 100-Mbps ETHERNET



KEVIN IRBY

Old network software can also cause slowdowns. For example, although Power Mac systems have a native Power Mac communications stack, the AppleShare client software is 680X0 code, and the server has only recently become available as a native Power Mac application. Until all components of the AppleShare network are available in native code, AppleShare users can expect to lose 60 to 80 percent against applications optimized for Power Macs on high-speed LANs running Open Transport. (Open Transport is the unified communications architecture with which Apple will replace MacTCP and the AppleTalk stacks in future versions of the Macintosh Operating System.)

Can the server handle it? Network applications that make heavy use of file servers are often restricted by the performance, configuration, and tuning of these servers long before the network itself becomes a bottleneck. Although AppleShare handles small networks well, managers of large networks need to choose the version and the hardware platform carefully.

AppleShare version 3, the low-end AFP (AppleTalk Filing Protocol) server, isn't designed for high performance. An AppleShare 3 server should be restricted to no more than 15 users. Beyond that, you need new software and hardware. AppleShare version 4, which runs only on special high-end Macs such as the Apple Workgroup Servers, offers two to three times the performance of AppleShare 3 on the same hardware.

More important, version 4 doubles to 30 the number of clients that can concurrently access the file server. Simply adding more memory to AppleShare 4 servers can help, as the software is smart enough to use all available memory for disk caching.

Recently, Apple announced the availability of AppleShare version 4.2, a native Power Mac AppleShare server. This new version can yield significant performance improvements on existing hardware without your having to change any network hardware. (AppleShare 4.2 replaces AppleShare Pro, which ran on Apple's Unix implementation, A/UX.)

Unfortunately, it's not as simple as buying the fastest Mac and putting the newest software on it. Apple's new communications software architecture, Open Transport, is not yet optimized for all platforms. That means that AppleShare 4.2 runs faster on NuBus-based Macs than on the newer PCI-based systems, but an AppleShare client on a PCI Mac runs faster than it would on a NuBus Mac. Not to worry: Apple assures us that everything will make sense and all relevant software—including the critical component, Open Transport 1.1—will be in place before this summer. Until then, be careful about your upgrade path; it may be slower than the old way of doing things.

What about the wire? Ethernet is a shared medium; all systems on the network use the same chunk of bandwidth (10 Mbps, in the case of Ethernet). If a large network is broken up into smaller chunks using bridges, switches, routers, and gateways, it usually makes more bandwidth available, because stations on different segments can transmit at the same time.

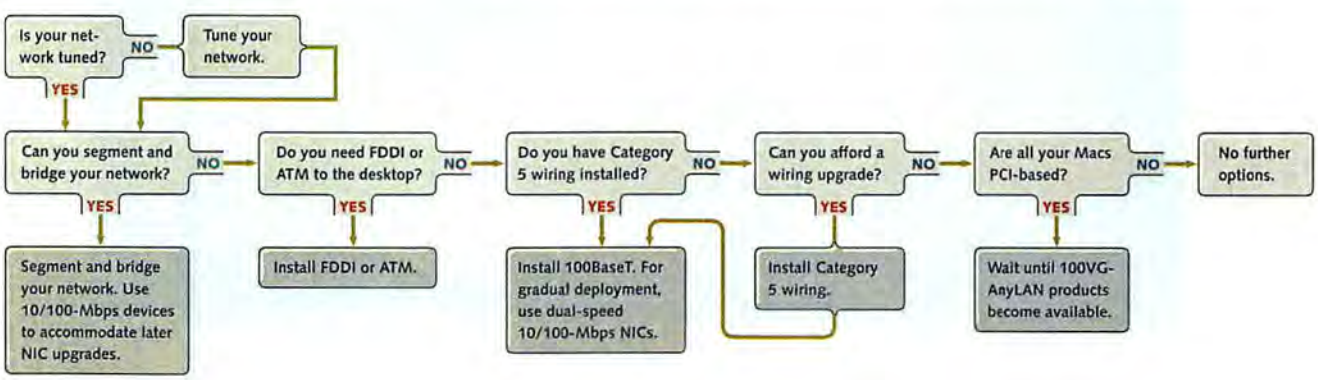
Segmenting a network is an easy way to stretch Ethernet technology. Isolating workgroups that put heavy demands on the network can make a poky network suddenly quite snappy. Segmentation has other advantages: it contains the effects of certain hardware failures, such as jabbering NICs, unplugged hubs, and shorted cables; and it increases security by reducing the number of nodes that see each packet.

Segmentation equipment is relatively inexpensive and very common. There are dozens of companies anxious to sell you switches, bridges, and routers to speed up existing networks. By dropping a switching hub—from vendors such as Digital Equipment Corporation (DEC), 3Com, and Cabletron—into a network in place of a standard 10BaseT hub, you can quickly increase network performance, but the change is completely transparent to the network workstations and servers. However, bear in mind that a 10-Mbps switching hub will solve only certain types of problems. By opening a direct link between a sending and a receiving device, a switch gives a big boost to the transfer of large files, such as the graphics that a publishing workgroup might share; for workgroups that send and receive many small files, such as a data entry group accessing a database, a switch provides little benefit, and a fatter pipe—100BaseT—is the better choice.

If you're considering jumping to a huge 100-Mbps LAN, it makes sense to look at inexpensive changes to network topolo-

SHOULD YOU DEPLOY 100BaseT?

Just because 100BaseT is available doesn't mean you should replace your 10BaseT network with it. If rewiring with Category 5 is too costly or topology has your hands tied, consider waiting for 100VG-AnyLAN, which runs on the older, Category 3, wiring; while waiting, try 10-Mbps switching hubs as a stopgap. But beware: 100VG-AnyLAN vendors may leave NuBus-based Macs to languish forever. If security, reliability, and potential bandwidth beyond 100 Mbps are critical—and price is no object—investigate FDDI or ATM. This decision tree provides a quick walk through the questions to ponder before jumping to a high-speed network.



SO HOW FAST IS YOUR NETWORK, ANYWAY?

A good network manager should be obsessed with performance data. Monitoring where your network is being used, by whom, and for what is the only way to determine how to optimize the network or to decide when to make the jump to a faster net.

In larger, mixed-platform networks, you can combine RMON (remote monitoring) hardware, from various vendors, with SNMP (Simple Network Management Protocol) management stations to capture traffic statistics. The RMON/SNMP model uses remote data-collection points (RMON agents) to gather information on network traffic and send it back to a central location (the SNMP workstation) for monitoring and long-term analysis.

Unfortunately, there's no good SNMP management station that runs on the Mac, but Mac network managers need not fear: AG Group (510/937-7900) has an excellent package—two products called Skyline and Satellite ($795 bundled)—for monitoring network performance throughout an extended Ethernet LAN. Skyline and Satellite use a model similar to the RMON/SNMP model: one Mac on each network segment runs Satellite and sends network-traffic information to a Mac running Skyline.



Bird's Eye View AG Group's Satellite and Skyline provide a continuously updated look at traffic on different segments of your network.

The performance information that Skyline and Satellite or an RMON/SNMP system provide should be part of any network analysis. For example, if you see that most of a network's traffic is among a small number of stations, such as a workgroup and its servers and printers, you'll know that moving those stations onto their own segment, separated from the rest of the net by a switch, bridge, or router, will probably produce better results than upgrading the entire network.

Performance data is key for another reason. If you cannot generate before-and-after snapshots of your network, you won't know the impact of changes as you reconfigure the net. It may take several network designs to find the one that works best for your environment, so it's important to gather performance information methodically.

A network analyzer is also part of the network manager's upgrade kit. Macintosh-based network analyzers such as Neon Software's (510/283-9771) NetMinder Ethernet ($695) and AG Group's EtherPeek ($795) work on 10-Mbps and 100-Mbps networks. No network manager should be without a handy protocol analyzer.

gy first. Even if 100 Mbps is the long-term answer, intelligent network engineering should be part of any upgrade plans.

The Move to 100 Mbps

OK, you've analyzed, tuned, reengineered, contemplated, and abused your network until you know that more bandwidth is the answer. The question remains: what kind of LAN will add the bandwidth you need? For the Mac, there is really only one answer: 100BaseT.

Warring factions within the IEEE have created a market break similar to the one that gave us Ethernet and Token Ring in the same time frame. 100BaseT and 100VG-AnyLAN have similar product profiles: Both are simple, inexpensive plug-and-play networks designed to replace 10-Mbps Ethernet. But only 100BaseT is broadly supported by Mac network vendors, with NICs for NuBus and PCI Macs, and NIC drivers for 680X0 and Power Mac systems. Farallon and Dayna have been shipping NuBus 100BaseT adapters for several months. For PCI Macs, the choices will be wider: Apple says at least 16 companies are shipping PCI-based 100BaseT cards, most with Mac drivers.

For a building or campus backbone, there are other choices: FDDI (Fiber-Distributed Data Interface) has been reworked to run on fiber-optic or copper cabling over much larger distances. ATM (Asynchronous Transfer Mode) offers much higher speeds in a switching environment.

ATM, victim of almost as much media hype as Windows 95, promises to bring gigabit bandwidth, complete integration of LAN and WAN traffic, and multimedia. But ATM is still an unfinished standard, and at least through 1996, it will remain too costly and rarefied for most Macintosh networks.

FDDI over fiber and copper is the most mature, stable, and widely available high-speed LAN technology. However, it's also the most expensive, with NuBus FDDI NICs from SysKonnect (408/437-3800) and PCI FDDI NICs from Alfa (408/934-3880), Rockwell (805/968-4262), and DEC (508/486-6963) costing closer to $1000 than the $200 or $300 for 100BaseT and 100VG-AnyLAN NICs. As a campus or building backbone, FDDI brings fault tolerance and proven technology; as a desktop LAN, FDDI will step aside for the two newcomers.

100BaseT is the low-price leader of the high-speed Mac LAN market. In addition to the inexpensive NICs, 100BaseT has another advantage: it may work on your existing twisted-pair wiring, keeping the upgrade cost low. NICs with fancy features cost a little more, but additions such as dual-mode compatibility, which lets the NIC work on a mixed 10-Mbps and 100-Mbps network, can greatly improve a network manager's quality of life.

Hubs for 100BaseT and 100VG-AnyLAN are not priced quite as competitively—the hubs for 100VG-AnyLAN are much more complex than 100BaseT hubs. HP, SMC, 3Com, and Asanté are all shipping hubs that support 100-Mbps networks. Expect hubs to add another $100 to $200 per port.

Wiring and topology can be major headaches for the upgrade to 100BaseT. 100BaseT has much stricter limits on wiring topology: network segments can be no longer than 250

PURCHASING 100BaseT PRODUCTS

NICs

All Mac 100BaseT network interface cards (NICs) are dual-speed, running at 10 Mbps on a 10-Mbps hub and at 100 Mbps on a 100-Mbps hub. NuBus cards cost about $100 more than PCI cards; not all vendors supply both 680X0 and Power Mac drivers for their cards.

Company	Product	Company's Estimated Street Price (NuBus/PCI)	Phone	Drivers (NuBus/PCI)
Asanté	AsantéFast Adapter series	$399/$269	408/435-8388	680X0/680X0, Power Mac
Dayna	BlueStreak series	$325/$225	801/269-7200	680X0/680X0, Power Mac
Farallon	Fast Ether series	$349/$249	510/814-5000	680X0/680X0, Power Mac
Rockwell	2300	not avail./$245	805/968-4262	not avail./Power Mac
Sonic Systems	Ether FE series *	$399/not avail.	408/736-1900	680X0/not avail.

** Sonic Systems also produces a $399 100BaseT NIC for the Mac LC's Processor Direct Slot.*

HUBS

Hubs come with anywhere from 6 to 24 ports in various combinations of 10-Mbps and 100-Mbps speeds. You can manage hubs with SNMP or proprietary tools, though only Asanté provides management tools that run on the Mac.

Company	Product	Company's Estimated Street Price	Phone	Ports	Stackable
3Com	LinkBuilder	$2899	408/764-5000	12	up to 8
Asanté	Plug-and-Play series	$1095–$1795	408/435-8388	6–12	no
Asanté	AsantéFast series	$1995	408/435-8388	8–12	up to 15
Cisco	FastHub series	$995–$7995	408/526-4000	4–16	no
Dayna	BlueStreak	$1799	801/269-7200	12	up to 2
Farallon	Fast Starlet	$1499 ($2199)	510/814-5000	8	no
NetWorth	Micro series	$1795–$4995	214/929-1700	8–24	no
NetWorth	FastStack	$2995 ($3995 w/management)	214/929-1700	12	10
Sonic Systems	StarBase series	$229–$429	408/736-1900	9–16	no

SWITCHING HUBS

Switching hubs present the same issues as nonswitching hubs.

Company	Product	Company's Estimated Street Price	Phone	Ports
3Com	LinkSwitch series	$3975–$4975	408/764-5000	12–24, various speeds
Alantec	PowerHub 4000 series	$3995–$9950	408/955-9000	12, various speeds
Asanté	ReadySwitch	$2195	408/435-8388	4 10 Mbps, 1 100 MBps
Cabletron	ESX-1320	$12,995	603/332-9400	12 10 Mbps
Cisco	Catalyst series	$3995–$6795	408/526-4000	25, various speeds
NetWorth	FastPipes series	$4495–$6995	214/929-1700	6–12, various speeds
Sonic Systems	EtherSwitch	$1299	408/736-1900	5 10 Mbps

BRIDGES

The 10/10 bridge has gone the way of the dinosaur. However, 10/100 bridges can connect two 10-Mbps segments.

Vendor	Product	Company's Estimated Street Price	Phone
Asanté	AsantéFast (10/100)	$1395	408/435-8388
Dayna	BlueStreak (10/100, 100/100)	$950	801/269-7200
Farallon	Fast Starlet (10/100)	$999	510/814-5000
Sonic Systems	FastBridge (10/100)	$899	408/736-1900

—Research assistance by Jim Feeley

HOW MUCH DOES 100BaseT COST?

The cost of upgrading to 100BaseT varies widely, depending on the existing cable and network topology and on how your organization is structured. These examples won't match your situation exactly, but they will give you an idea of how to go about pricing your own scenario. (See the sidebar "Purchasing 100BaseT Products," for details on who sells what.)

GOAL: CONNECT TO BACKBONE

You need to connect 50 PCI-based Power Macs to a building backbone that has been upgraded to 100BaseT; Category 3 cable is installed in the Mac workgroup's site.

FIRST STEP: Install 10/100 bridge. Cost: 1 at $1000.

SECOND STEP: Install dual-speed 10/100 NICs. Can deploy gradually. Cost: 50 at $250.

THIRD STEP: Rewire workgroup with Category 5. Cost: 50 at $200 to $500.

FOURTH STEP: Install mixed 10/100 hubs. Can deploy gradually, as you deploy NICs. Cost: 5 at $1500.

Total estimated cost: $31,000 to $46,000.

Notes: The 10/100 bridge gives immediate access to the backbone, while you implement the transition to 100-Mbps hardware gradually. However, you'll eventually want to replace the 10/100 bridge with a 100/100 bridge.

GOAL: HELP STAFF COLLABORATE

The legal department's 40 attorneys take turns developing strategies and critiquing one another's work. They also research legal precedents on CD-ROM servers and an internally developed client/server knowledgebase. The whole office is running 10BaseT over Category 5 wire. Half of staff uses PCI-based Macs and half uses NuBus-based Macs.

FIRST STEP: Install dual-speed 10/100 NICs. Can deploy gradually. Cost: 20 at $250 (PCI) and 20 at $350 (NuBus).

SECOND STEP: Replace hubs with mixed 10/100 hubs. Can deploy gradually, as you deploy new NICs. Cost: 4 at $1500.

Total estimated cost: $18,000.

Notes: High traffic from frequent E-mail, server accesses, and file transfers demands a lot of bandwidth.

GOAL: SPEED FILE TRANSFERS

The 10 members of the publications department need to transfer photos and illustrations. The company network is 10-Mbps Ethernet over Category 3 cable.

FIRST STEP: Install bridge to segment workgroup from main network. Cost: 1 at $1000.

SECOND STEP: Install switching hub. Cost: 1 at $1300.

Total estimated cost: $2300.

Notes: The occasional transfer of large files probably doesn't require 100BaseT; a switching hub will improve throughput for large files.



Farallon Fast Starlet bridge



Dayna BlueStreak dual-speed PCI NIC



3Com LinkBuilder stackable hub

feet, only one-tenth the length supported by 100BaseT. This requires more careful engineering for large networks and more routers and bridges than a 10BaseT network, or for that matter, 100VG-AnyLAN network. This, in turn, means that large 100BaseT networks will be more expensive than similarly sized 100VG-AnyLAN networks. On the other hand, small networks will benefit from a lower per-port cost for 100BaseT hubs.

For small networks, there are few differences between the two standards. Mac managers will be most concerned with wiring. 100VG-AnyLAN will run over any standards-compliant 10BaseT network using four pairs of Category 3 (or higher) cable, which is what most small Ethernet LANs run on now. 100BaseT generally requires Category 5 cable—for 100BaseT the cable is called 100BaseTX, but it's identical to the Category 5 wiring common in newer 10-Mbps LAN installations. (Note that there is a variety of 100BaseT, called 100BaseT4, that runs over Category 3 cable. It is not compatible with other 100BaseT equipment and is not available from most 100BaseT vendors—in fact, the 100BaseT4 standard has yet to be finalized.) So if your network uses Category 5 wire throughout, you can choose either technology. If you have Category 3 wiring, you'll have to use 100VG-AnyLAN or take on the additional cost and effort of rewiring. For networks running over coaxial cable, you can choose any technology you want because you'll have to rewire anyway. None of these new LANs work over coaxial cable.

The Last Word

If your first impulse is to run out and buy a high-speed LAN, don't. Network analysis, reengineering, segmentation, and software upgrades will deliver greater benefits for most business applications. Even if you've tuned your network within an inch of its life, try to hold on for a few months until Apple brings out bug-free software for NuBus and PCI, Power Mac and 680X0 systems. The market also needs time to shake itself out. Either 100VG-AnyLAN or 100BaseT could solve your problems, but choosing one before things have settled down could strand you with an expensive LAN and few upgrade paths. ■

JOEL SNYDER is a senior partner at Opus One, based in Tucson, Arizona. He specializes in networks and information technology.



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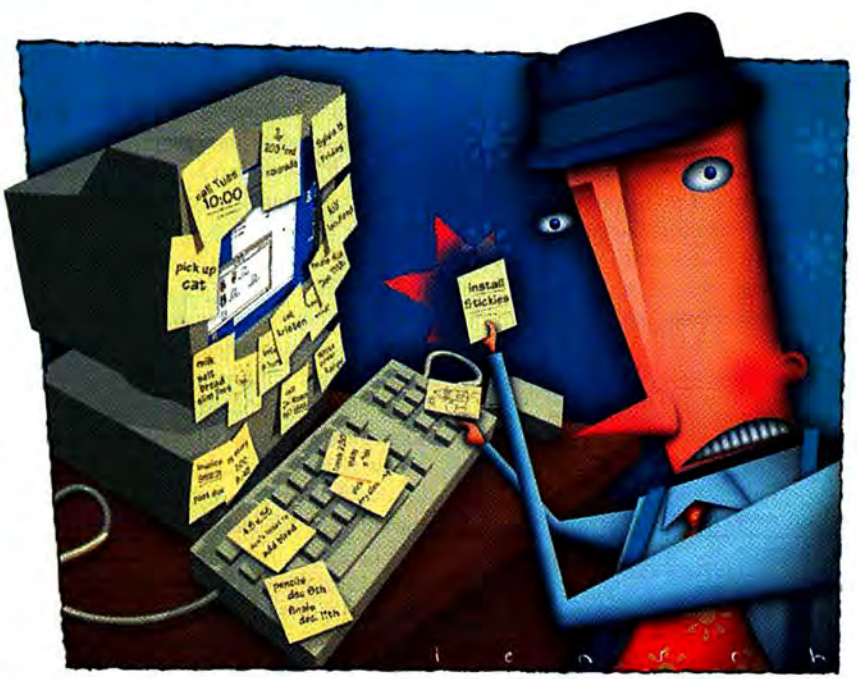
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Secrets

The Secret Life of Stickies

GOOD FEATURES COME IN SMALL PACKAGES

by Joseph Schorr



CHRIS LENSCH

For as long as I can remember, my Mac has been covered with Post-it notes—little reminders to return a phone call or buy salami or pick up the dry cleaning. Nowadays, of course, most of my Post-its are of the electronic sort, thanks to Stickies, the System 7.5 utility that lets you post sticky notes right on your Mac desktop.

If you're serious about Stickies, pay heed to the following tips and secrets—they can help you create, format, and print sticky notes more efficiently, as well as unlock the Stickies' hidden word-processing features.

Stickies Stationery

You may already know how to set up a default sticky note style: you create a new note; assign it the color, text style, and dimensions you want; and then choose Use As Default from the Edit window. But wouldn't it be great if you could have multiple note styles—say, a narrow yellow note with large type that automatically opens for vital phone messages and a tall, skinny, blue note with smaller type to record to-do items? You can—by creating Stickies stationery.

To set up a Stickies stationery document, launch Stickies, make a new note and assign it the color, style, and size you want. You can even include some default text—the words *Phone Message* across the top of the note, for example. When you've finished, choose the Export Text command from the File menu and choose the Save As Stationery check box. Give the note a name, then click on Save. Instead of writing the note into the standard Stickies file inside the Preferences folder in the System Folder (where all your existing Stickies notes are saved in one big, disorganized heap), Save As Stationery creates a completely separate note file. Double-clicking on the resulting stationery document launches Stickies and automatically creates a new, blank sticky note with exactly the attributes you've specified. What used to take two steps now takes one.

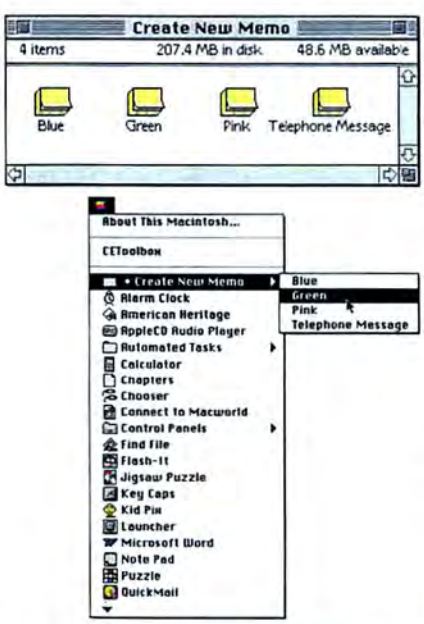
For even more efficiency, create one stationery document for each style of note you plan to use, then stick them all in one folder called New Notes and add that folder to the Apple Menu. Now, whenever you want to post a new sticky note, all you have to do is choose the note style you want from the New Notes submenu on the Apple Menu, and your new sticky note will appear with exactly the color, size, and type style you want (see "Notes on Demand").

Sticky Printing

Sure, you can print all your sticky notes at once using the Print All Notes command, but in what order does your Mac print them? Is it the order in which they were created? The order in which they're stacked up on the desktop? By color?

Turns out the Mac prints the most recently modified note first. This means, of course, that you can control the printing order by typing as little as a single character in each note. So here's a quick way to set up a custom printing order if you have a lot of notes: Collapse all of them by clicking in the upper-right-hand resize box, and line them up vertically in the print order you want. Click on the bottom note and press the spacebar once, then click on the next note up and press the spacebar again, then move to the next note up, and so on. Nothing will appear to happen, but you're actually adding a single space to the end of each note (yes, you can type into collapsed notes) and updating its time stamp. When you choose Print All Notes, the notes will print in the order in which you have lined them up.

By the way, if you have more than a handful of sticky notes on screen, choosing Print All Notes may result in a not-enough-memory message. If so, increase the Stickies' memory allocation from the default 120K to about 500K. (You do this as you would for any application: select the Stickies icon, choose Get Info from the File menu, and type the new allocation number into the Preferred Size field of the Get Info window.)



Notes on Demand You can open up sticky notes in the style of your choice by turning formatted sticky notes into stationery documents (top), popping them into a folder, and adding them to your Apple Menu Items folder (bottom).

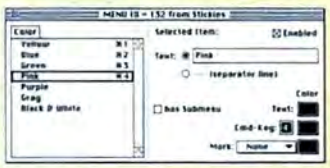
THE COLORFUL WORLD OF STICKIES

Sticky notes come in six pastel colors (as well as black-and-white) but changing the color of a note involves visiting the Color menu. With ResEdit, however, it's easy to add keyboard shortcuts directly to the Stickies program, allowing you to switch note colors instantly without using the mouse. Here's how.

1. Open a copy of the Stickies program with ResEdit and double-click on the MENU resource icon to open it.

2. Open Resource 132, which is the Color menu.

3. Click on the first item on the menu—Yellow—and then type the keystroke you want to assign as a shortcut in the Cmd-Key field (see "Color by Number"). You can use any number, letter, or character not already assigned as a ⌘-*key* shortcut within the Stickies application. Assign a different keystroke to each color. (The numbers 1 through 7 work well.)



Color by Number Use ResEdit to assign keyboard shortcuts to the stickies.

4. When you're done, save and close the file. The next time you launch your altered version of Stickies, you'll be able to use your ⌘-*key* shortcuts to switch the color of a selected sticky note.

Stickies: The Tiniest Word Processor

Stickies, a word processor? OK, it's not Microsoft Word, but Stickies does have a surprising number of hidden features you can use for quick-and-dirty text editing. Here are some of the slick tricks you should know about.

- You can import any plain text file directly into a sticky note using the Import Text command—or you can just drag a text document onto the Stickies icon. In either case, the text file opens in a new note window, in the font and style you've defined as your default. This is a handy way to read E-mail messages you've saved from America Online or eWorld, and it beats opening such files in SimpleText because Stickies automatically formats the text in the font and style that you've specified as soon as it opens the note.
- You can drag and drop selected text within and between sticky notes. Dragging text moves it or copies it to a new note, while option-dragging copies the selected text within a single note only.
- You can press ⌘–left arrow (←) or ⌘–right arrow (→) to go to the beginning or end of a line of text—another feature SimpleText doesn't support.
- Sticky notes have no scroll bars, but there are plenty of ways to navigate lengthy notes. The home and end keys on extended keyboards move you to the beginning and end of a note. More useful, though, is ⌘–down arrow (↓), which not only transports you to the end of a note, it also plants your cursor there; ⌘–up arrow (↑) works the same way. So if you want to add material to the end of an already lengthy note, you don't have to do any scrolling or mouse-clicking. Just press ⌘–down arrow and start typing.

Here are a few more tidbits that can make using Stickies easier and faster:

- Option-clicking on a note's zoom box collapses the note to a single line (simply clicking on the zoom box does the same, if that's the preference you've selected), but if you have WindowShade turned on you can collapse a note by clicking anywhere on the top strip of the note, as for any window; you don't have to mess with the zoom box at all.
- You can choose a collapsed note as your default note style. When you create a new note, the note window appears collapsed; but it opens automatically as soon as you start typing, and it expands to fit the length of your text.
- When resizing a note, you can constrain the resizing to one direction by holding down the shift key as you drag. (This feature works only in Stickies 1.0.1, which comes with System 7 Update 1.0.)
- When you close a note, a standard dialog box appears asking if you want to save the note or close it without saving it. Instead of clicking on the Don't Save button, you can just press ⌘-D.
- A sticky note can hold a maximum of 8000 characters, which is almost the length of this whole column. **m**

Contributing editor JOSEPH SCHORR is co-author of *Macworld Mac and Power Mac Secrets*, third edition (IDG Books Worldwide, 1996).



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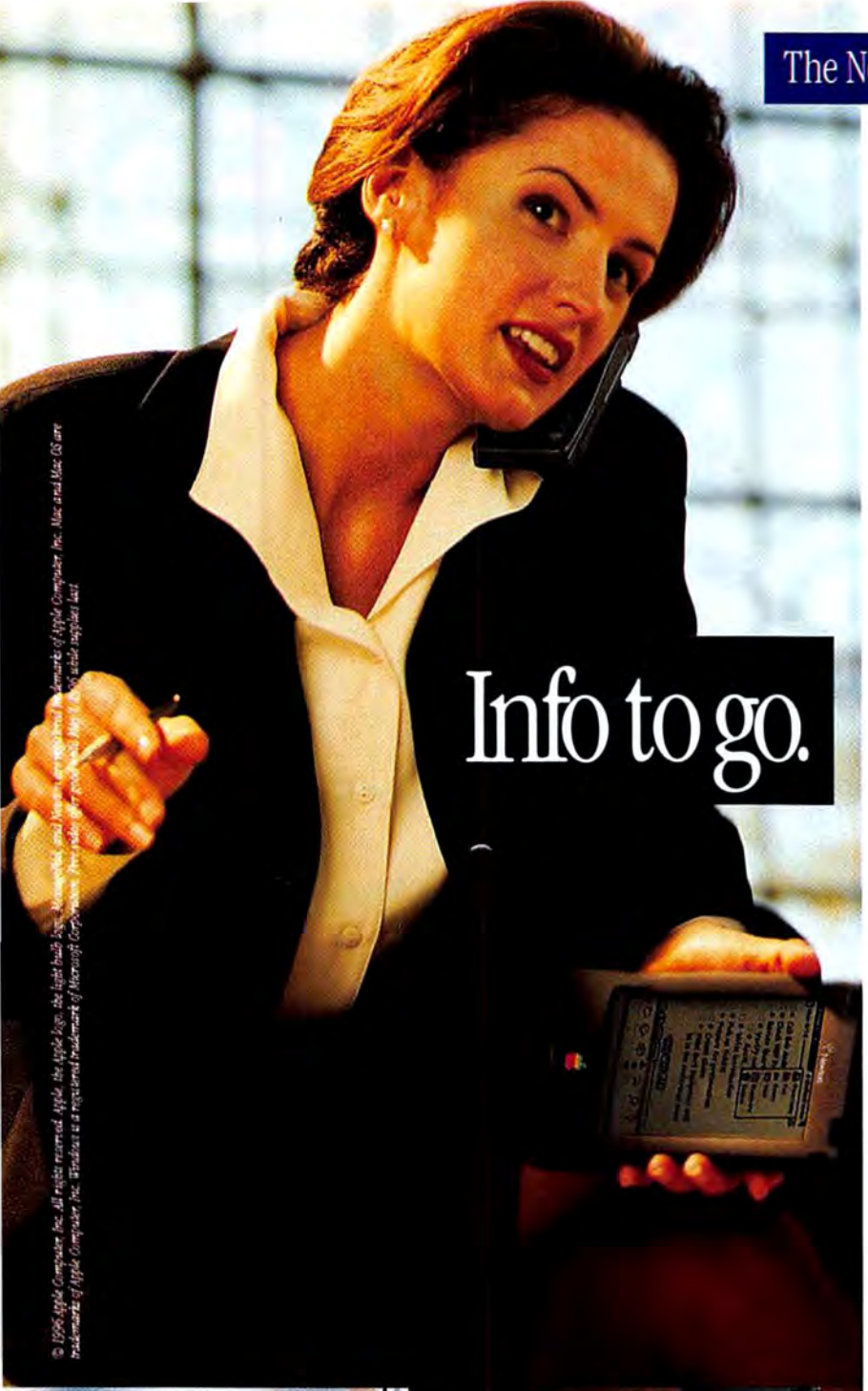
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Quick Tips

Tips, Tricks, and Shortcuts

by Lon Poole

Characters in pulp fiction signal their accomplices by raising and lowering window shades, and sometimes they even hide hot money in a rolled-up shade. I wouldn't suggest you apply those conventions to your Mac desktop with System 7.5's WindowShade control panel, but like its real-world counterpart, the Window Shade does have secondary uses. For example, Kenneth M. Yamaguchi of San Francisco rolls up a document window to speed transfer of long message lists in FirstClass. And Ron Rossignol of Lewiston, Maine, finds that just as shaking out a blanket gets rid of wrinkles, rolling a window up and down to redraw it usually clears up the superficial nicks and debris—such as QuarkXPress's tendency to display normal text in what appears to be bold—that occasionally appear in his publishing and graphics files. Mark Altenberg of Kensington, California, notes that you can drag files and folders to the title bar of a rolled-up Finder window. You don't get any visual feedback—the title bar doesn't highlight as the rolled-down window would—but the items are placed in the window. (This title-bar trick doesn't seem to work with other applications that allow drag-and-drop copying of text and graphics between windows, such as the Scrapbook and WordPerfect.)

You can use this same technique to fix a known problem with Aaron, a shareware extension that gives System 7.5 a Copland look (see "Copland Now"). On a 680X0 Mac, if you collapse a large window with Aaron 1.1.3 by clicking the window-shade control Aaron adds to the title bar, any small window that was hidden behind it may appear to be empty. To force the small window to redraw, Luke Kapustka of Black Mountain, North Carolina, suggests you quickly collapse and expand the empty window by clicking its window-shade control twice.

The Same ATM

Q Is there a difference between the Adobe Type Manager (ATM) software Apple bundles with QuickDraw GX and the ATM Adobe distributes?

S. Shaffer
via eWorld



A ATM GX (as it's known among the QuickDraw GX cognoscenti) is the same as regular ATM straight from Adobe. QuickDraw GX 1.1.3 comes with ATM 3.8.3, the latest version at this writing. You can install and use ATM GX without the rest of QuickDraw GX (choose Custom Install from the Installer's pop-up menu). Conversely, if Adobe releases a new version of ATM, you can install and use it with QuickDraw GX.

Note that ATM GX is not the same as SuperATM, which includes a database of font metrics and two Multiple Master fonts for synthesizing substitute fonts. You can install SuperATM before or after installing QuickDraw GX. If you install SuperATM first, ATM GX uses SuperATM's Multiple Master fonts and font-metrics database. If you install SuperATM second, it replaces ATM GX.

Getting the Whole Picture

Q My PowerBook 520c has an external CD-ROM drive. Can it run CDs that require more than 256 colors or a screen larger than 12 inches?

Jonathan Satcher
Seattle, Washington

A Any Mac can display images with more than 256 colors. For images created at a color depth higher than your Monitors control panel's current setting, the Mac OS automatically substitutes the best available colors for those in the image not visible at the current color depth. The image may get splotchy and some details may drop out. To see how this works, experiment with different Monitors settings while looking at a color picture.

As for screen size, what matters is not the diagonal measure of the screen surface but the resolution of the displayed area. Your PowerBook display has a resolution of 640 by 480 pixels, the same as a standard 14-inch color monitor. Most CDs are designed to work at that resolution.

Although the Mac OS adaptively displays screen images at the available color depth, a software developer can design a program that runs only at specific color

continues

JOHN BLECK

depths and screen resolutions. For example, some After Dark modules, like Satori and Vertigo, only run at 256 colors or grays. Any CD that requires more colors should clearly state that on its packaging.

Balky File Sharing

Q After I installed System 7.5 on a new hard drive attached to my Mac IIsi, everything worked except file sharing. When I tried to start it, I got the message "File sharing cannot be enabled." Now file sharing no longer works with System 7.1 on my old hard drive. Disabling some extensions and reinstalling file-sharing software for System 7.5 produced the same unhelpful message. What could be blocking file sharing?

MATT DEMPSEY
Jackson, Mississippi

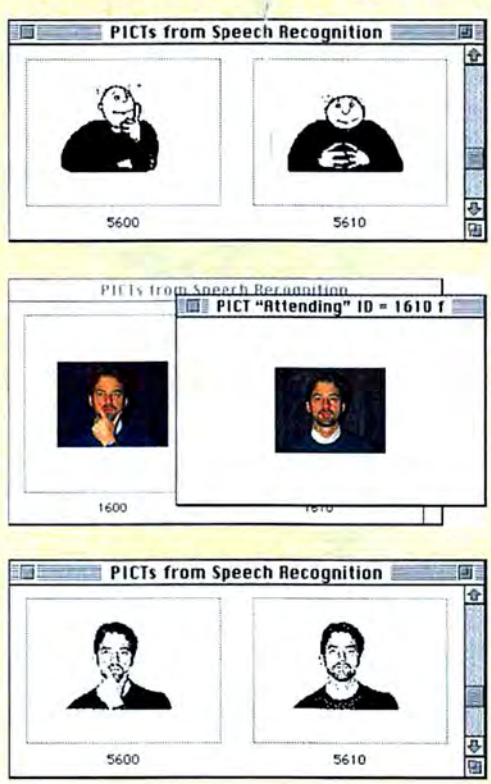
A Any of the following could be the cause: the presence of software that doesn't support Apple file sharing, such as TOPS; less than 360K of space free on each volume you make available for sharing; less than 270K of RAM free; damaged PRAM (parameter RAM) settings; conflicting extensions; a damaged Users & Groups Data File; a damaged File Sharing folder; outdated hard disk driver software; a damaged invisible AppleShare PDS file on shared volumes; damaged file-sharing software or other system software; or a bad block on a hard drive. An article available from Apple's fax-on-

continues

New Persona

Can't find a persona that suits you among the eclectic gang of nine that Apple provides for speech-recognition feedback? Jan Kadlec of Kimberley, British Columbia, Canada, discovered you can use ResEdit to replace any standard persona with one you draw, scan, or digitize. You need pictures of the new persona showing several different expressions, such as not paying attention, paying attention, speaking (mouth open and mouth closed), hearing, and not understanding. Some of those expressions require a sequence of pictures; the total number of pictures you need depends on which of the standard personas you replace.

1. To find out which pictures you need, make a copy of the Speech Recognition extension and open it with ResEdit. Open the PICT resources and scroll through them until you find the pictures you want to replace. Each persona has two sets of numbered pictures, one in color and the other in black and white. The black-and-white pictures look fine in ResEdit, but their color counterparts look goofy because Apple omitted their color tables to preserve disk space. However, since the color pictures you substitute will include their accompanying color tables, they'll look OK in ResEdit. The numbers denoting the black-and-white pictures are exactly 4000 higher than those of the corresponding color pictures. The color pictures are used in a feedback window on a monitor displaying 256 or more colors.



2. Create a replacement for each picture in the set you've decided to change. Copy each new picture and paste it into the appropriate PICT resource. Each color or gray-scale replacement picture must include color table information, or the picture will not display properly when you turn on speech recognition later.

For best results make all the new pictures the same size as the pictures they replace. The standard personas and their picture sizes (in pixels, height by width) are: Vincent, 25 by 20; Buster, 51 by 58; Sally, 67 by 50; Pat, 68 by 52; Raymond, 90 by 69; Phil, 61 by 76; Lights, 39 by 13; Connie, 60 by 60; and Jay, 46 by 51.

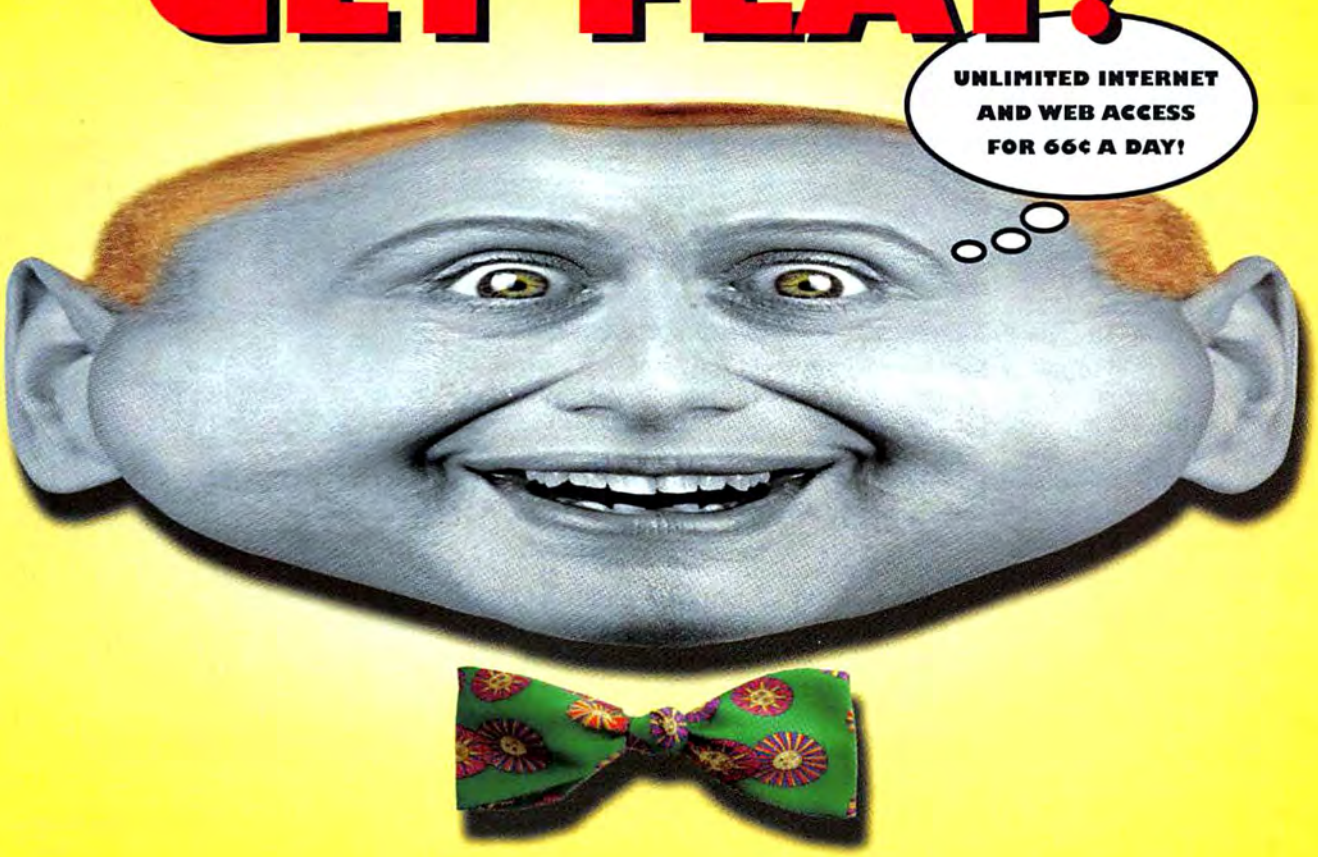
3. If you ever use speech recognition with the number of colors or grays set at less than 256 in the Monitors control panel, you must also convert each replacement picture to a black-and-white bitmap and paste it into the appropriate PICT resource.

4. If you want to change the name by which the persona is known in the Speech control panel, you should open the STR resource that has the same number as the persona's lowest-numbered PICT resource, and edit the text.

5. Save your changes to the copy of the Speech Recognition file and close it. Move the unmodified original out of the Extensions folder, rename the copy Speech Recognition, and put it in the Extensions folder. Restart to see the new speech-recognition persona.

These instructions assume you have version 1.4.1 of the speech-recognition software, part of PlainTalk. If you have version 1.3, note that the PICT and STR resources are in the SR Monitors extension, there are no black-and-white pictures, and the color pictures do not look strange in ResEdit. Also, the Speech control panel is called Speech Setup.

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More GUI Internet Access

Ordinarily you need a PPP or SLIP account on the Internet to use graphical programs such as Netscape Navigator and Eudora. As mentioned in *Quick Tips*, December 1995, you can use those programs with a shell account by converting it to a pseudo-SLIP account with The Internet Adapter (TIA) ($25; Soft Aware, 310/305-0275; *tia-info@marketplace.com*). You can also convert a shell account with SLiRP (free; *http://blitzen.canberra.edu.au/slirp*), which *natasha@magg.net* finds to be a little faster than TIA. Another advantage SLiRP has over TIA, says Scott Krajewski of Ames, Iowa, is its ability to redirect ports so even if you don't have a real address on the Internet you can still set up your computer as a part-time FTP server (but not a Web site).

Having said all that, how would you like to ignore PPP, SLIP, shell, and all that Unix stuff, yet still use graphical Internet programs? A few service providers, such as Open Door Networks (503/488-4127), offer Internet access through Apple Remote Access (ARA). When you make an ordinary ARA connection to the service provider's AppleTalk network, you not only have access to familiar network services that the service provider makes available, such as AppleShare file servers—you also have transparent access through a gateway to the Internet.

Playing Audio CDs

If you have an external CD-ROM drive, you may be able to play audio CDs through your Mac's built-in speaker or external speakers (contrary to what I said in November's *Quick Tips*). Yuan-Yuan Sun of Zurich, Switzerland, accomplishes that with the freeware PlayThrough by Andreas Pardeike (available from Macworld Online) and a cable that connects her CD-ROM drive's headphone jack to her LC III's sound-in port. If you can't adjust your drive's volume, you may have to use an attenuating cable to avoid distorted sound. You launch PlayThrough and leave it open, but to put it in the background you must click outside its window (the Application menu doesn't work). To disable play-through, choose Quit from PlayThrough's File menu, which is labeled in German (Ablage) and contains German commands for setting the volume (Lautstärke 0 through 7).



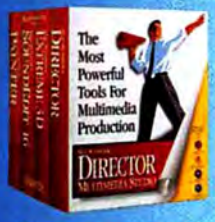
Copland Now To see how the next major revision of the Mac OS might look on your desktop, just install the Aaron software and optionally a set of additional folder icons (all available from Macworld Online). Clicking the control Aaron adds to the right edge of a window's title bar alternately collapses a window into its title bar and expands it, like System 7.5's WindowShade control panel.

Shared Bookmarks Caution

If you decide to put your user name and password for a confidential Web site in the Description box of Netscape Navigator's View Bookmarks window as described in last month's *Quick Tips*, Paul Devine of Macworld Online suggests you think twice about sharing your bookmarks file. Anyone who has that file will also have access to any information you typed into the Description box. ■

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LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. He's the author of *Macworld System 7.5 Bible*, third edition (IDG Books Worldwide, 1994).



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Joseph Schorr co-authored the 1st, 2nd, and 3rd editions of *Macworld Mac and Power Mac SECRETS.* He is a contributing editor and has recently launched the new SECRETS column in *Macworld* magazine—check it out each month.

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Descending into Babel, Web-style

by Suzanne Stefanac

In a computing world disjointed by platform incompatibilities and operating-system power plays, the World Wide Web is a welcome oasis of accord. Macintosh, Windows, and Unix users can all read the same Web pages, no matter which platform authors or serves up the code. Enjoy the calm while it lasts. The inevitable quest for corporate hegemony promises a descent again into techno-Babel.

At the heart of both the current peace and coming fragmentation is a lowly protocol, HTML (Hypertext Markup Language). Admittedly, this lingua franca of the Web has been stretched well beyond its initial intent by the sudden popularity and diversity of the Web and is suffering growing pains. HTML 3.0 is in the works, but so far it is generating more controversy than it is Web pages (see "HTML 3.0 Proposals").

Purists maintain that version 3.0 will be well worth the wait, and that strict adherence to HTML standards is an imperative if we are to maintain interoperability on the Web. They're right. Would-be lords of the Web counter with smirks and suites of proprietary code, arguing that Web traffic and commerce demand fixes today, not in some distant committee-driven future. They're right, too.

Deciding which camp to follow is simpler for Web users than for Web publishers. Only a year ago, the obvious browser of choice was NCSA's Mosaic. A bit kludgy but free, Mosaic served as training wheels for hundreds of thousands of new Web aficionados. Today, most Web users opt for Netscape Navigator 1.1 ($39), Mosaic's much-hyped stepchild. Netscape 1.1 conforms to most HTML 2.0 dictates but adds just enough proprietary code to complicate Web display. Backgrounds, tables, centering, the ability to align text next to an image, and limited animation all lend a touch of sophistication to Netscape Web layouts. Meanwhile, about 40 percent of the people accessing Web pages use browsers from America Online, NSCA, or Microsoft Network, none of which read these Netscape niceties.

Consequently, Web publishers are skewered on the horns of a no-win dilemma. If you author pages that employ Netscape's tags, the pages display awkwardly when viewed with other browsers. If you adhere to HTML 2.0 guidelines, your pages lack the pizzazz Web visitors are beginning to expect.



More Clouds Loom

It's going to get worse, maybe a lot worse. At press time, beta versions of Netscape 2.0 up the ante considerably. In return for occupying 2MB of memory and at least 4MB of RAM to run reasonably, the new Netscape promises more control of font color and size, better SLIP and PPP connections, faster disk caching, an integrated E-mail reader, an address book, improved bookmark functions, and perhaps most threatening to HTML purists and Web-design aesthetes, framing—the ability to add scrollable windows within windows to individual Web pages.

Although Netscape is still cross-platform, Windows and Unix versions are considerably more robust. For instance, Macintosh users who load Netscape 2.0 will reportedly not enjoy support for Open Transport or AppleScript. And although Windows and Unix betas let you play QuickTime, Macromind Director, HotJava, and Acrobat PDF files within the browser, Macintosh users are still waiting for those functions.

Meanwhile, Microsoft Network's browser, Internet Explorer 2.0, promises such proprietary features as control over fonts, its own integrated E-mail solution, and the ability to repeat certain actions through looping. Inexplicably, Microsoft chose to support AVI rather than the much more popular MPEG and QuickTime video-compression formats, and introduces a

continues

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HTML 3.0 Proposals

IT IS IMPOSSIBLE TO GAUGE EXACTLY WHEN THE HTML 3.0 DRAFT SPECIFICATIONS will be elevated to the level of a standard. The IETF (Internet Engineering Task Force) still hasn't granted HTML 2.0, the de facto standard of the Web, its final endorsement. Among the HTML 3.0 tags and elements being circulated for comment are the following:

- alignment of text and images (flush left, flush right, centered, and justified), the single most requested enhancement
- text flow alongside images and tables, allowing much more graceful layouts
- tables that allow elements to align horizontally as well as vertically
- foreign-language and math-symbol support, greatly broadening the base of users
- more-flexible links, including the ability to link images by shape
- the IMAGE attribute replaced by FIGURE, allowing overlays, captions, and credits, as well as mapping without CGI (Common Gateway Interface) scripts
- banners that float at the bottom of the screen, remaining in view even if a page is scrolling
- new logical tags for quotations, abbreviations, acronyms, and legal text; new physical tags for underlining, strikethrough, and sub- and superscripts; and new en and em spaces and dashes
- style sheets that provide hints for text size and color, space between paragraphs, and the hierarchical display of headings, the most disputed of the new tags

The daring who wish to test HTML 3.0 enhancements can try two Unix-based browsers (no Mac browsers can yet read the tags)—the W3 Consortium's Arena and the Emacs-w3 browser.

Web Worthy

THERE'S NO PLACE LIKE THE WEB TO LEARN HTML. AFTER ALL, THE WEB'S format is the ultimate show-and-tell environment for would-be online publishers. Beginners can find easy-to-understand HTML tutorials at *http://www.ncsa.uiuc.edu/demoweb/html-primer.html*, from the National Center for Supercomputing Applications, University of Illinois, and at *http://www.cs.cmu.edu/~tilt/cgh/strict-html-single.html*, handiwork of the School of Computer Science, Carnegie-Mellon University.

Once the fundamentals have been conquered, fine-tuning is the challenge. Developing a High-End Web Site at *http://www.charm.net/~web/Style/* and Web Wonk at *http://www.dsiegel.com:80/tips/tips_home.html* are two top-notch sites for more experienced HTMLers. Style and HTML etiquette are key elements, and both are expertly covered in MIT's Style Guide for Online Hypertext at *http://www.w3.org/hypertext/WWW/Provider/Style/Overview.html*.

Of course this list is just a hint of what's available: for more, check out Web Masters at *http://miso.wwa.com/~boba/masters1.html*. It's a resource extravaganza, linked and ready for you to explore.

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Shareware PICKS

Mac shareware products are still some of the best and cheapest tools for creating your own Web site. Here are some of our favorite HTML shareware applications.

HTML TableTool is a freeware HyperCard stack that turns tab-delimited text files (information from spreadsheets or databases) into HTML-tagged text that you can plug into your Web pages to create simple tables.

One of the slickest HTML tools out there is **Arachnid** from the University of Iowa. It's a WYSIWYG authoring system that supports forms creation, site management, and a variety of image tools. By the time you read this, it may even support HTML tables. At press time, the latest version was 1.9, and it's freeware.

The grandfather of all HTML-savvy text editors is BBEdit. Its plug-ins for HTML tags are first-rate. Download the demo, **BBEdit Lite 3.5**, a save-limited version of the full application, if you like writing your HTML from the ground up.

You can find these applications in the Macworld Online Software Library on America Online or on our Web site (*http://www.macworld.com*). They are in the Mentioned in Macworld section.

—MATTHEW HAWN

so-called marquee tag that seems to compete with the HTML 3.0 banner tag. Microsoft promises a free Mac version of Internet Explorer by the time you read this.

Commercial online services have struggled to keep up with the Web's amazing growth, but regrettably they have been upgrading Web access faster for their Windows clients than for their Mac customers. America Online's Web browser happily doesn't add any proprietary tags, but ever-increasing traffic and the need to go through AOL's mainframe computers greatly slow Web access. The Mac browser software has also been a disappointment, offering little of the integration and functionality of the Windows client. CompuServe doesn't currently offer a Mac version of its Web browser. Both companies promise improvements this spring, but keeping up with quickly changing standards will be a major challenge.

It's unlikely that an unsullied standard will win out, but it would be a great loss if the Web were to degenerate into a mosaic of squabbling browsers, each touting its proprietary enhancements. **m**

SUZANNE STEFANAC, editor of Macworld Online, is an advocate of open standards and interoperability.

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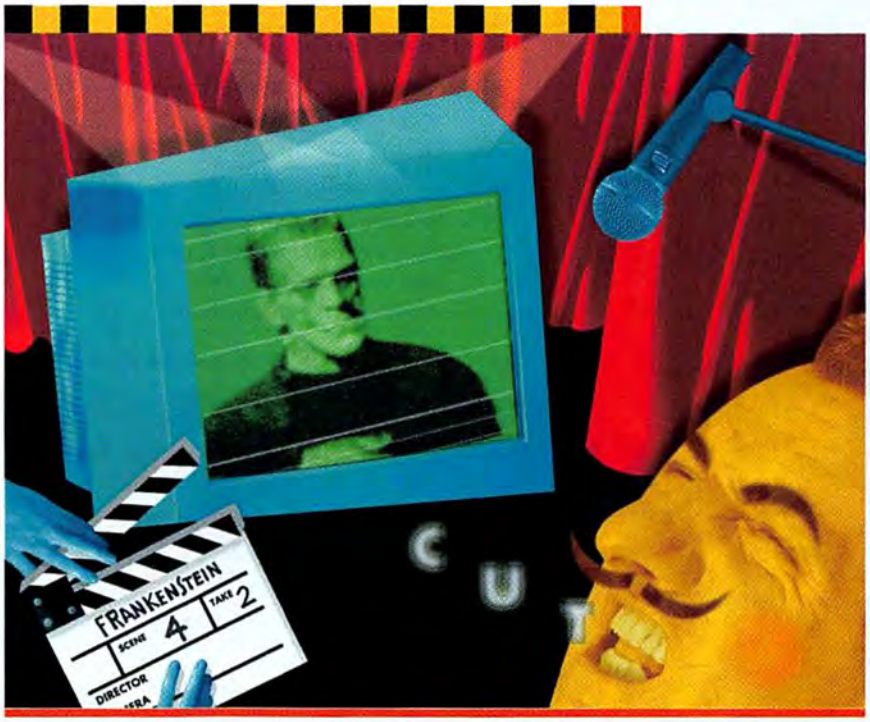
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Media

Cinepak Secrets

HOW TO USE CINEPAK FOR THE BEST-LOOKING CD MOVIES TIME CAN BUY

by Jim Heid



GORDON STUDER/FRANKENSTEIN IMAGE © UNIVERSAL STUDIOS, 1931/MPTV

Of all the data types that go into an interactive CD-ROM, which imposes the greatest playback demands on a computer: text, graphics, sound, or video?

Anyone who answered text is hereby sentenced to a windowless cubicle in the Microsoft Office. The answer is, of course, video. Playing a QuickTime movie requires a computer to whip up hundreds of thousands of fresh pixels every second.

The biggest bottleneck in the process is the CD-ROM drive itself. While the hard drives used with high-end digital-video gear can transfer millions of bytes per second, a quad-speed CD-ROM drive transfers only about 600,000 bytes per second. And the far more popular double-speed drives transfer at only about half that speed.

Getting a movie to play back smoothly from a CD-ROM requires lowering the movie's data rate—that means adjusting the amount of information (the number of bytes per second) a drive must transfer to put those "moving pictures" on your screen—to within a CD-ROM drive's capabilities. CD producers have several techniques for lowering a movie's data rate, such as using small movie windows, also called quarter-screen windows (no larger than 320 by 240 pixels), and using slow frame rates, such as 10 or 15 frames per second (fps), instead of TV's 30 fps. More often than not, they also compress the final movie using Cinepak, the only standard QuickTime compressor that lets you specify a maximum data rate.

These techniques yield a movie that plays from a CD, but they don't guarantee the movie will look good. Cinepak compression can make a movie look chunky and pixelated. You can't completely avoid compression artifacts, but you can do a lot to minimize them.

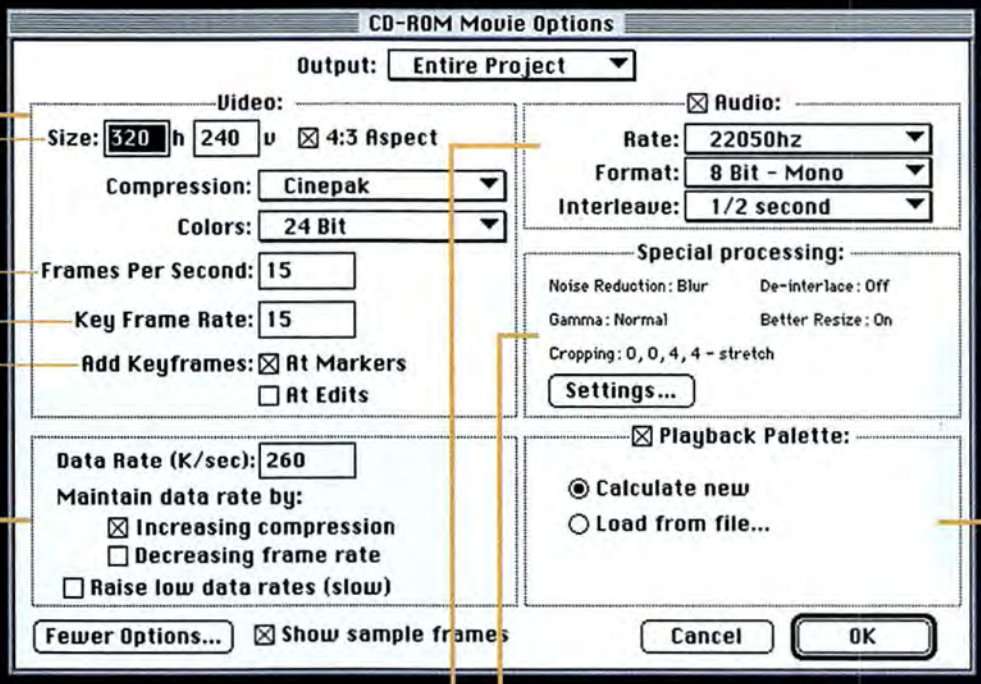
Shooting Tips

Compression is most effective when your video contains simple backgrounds and as little motion and video noise as possible. Here are the rules of thumb.

• *Shoot in the highest-quality format you can afford.* High-end video formats exhibit less video noise than low-end ones. Video noise, which looks like faint, dancing snow, is bad news because it adds unwanted motion to the entire frame. In its zeal to retain that motion while

Steps to Better Cinepak Movies

Following a few rules when compressing in Cinepak can deliver dramatically better movies. I used Adobe Premiere 4.2's CD-ROM Movie Maker plug-in module to illustrate these rules, but the concepts apply to any compression utility. The ultimate lesson here is that creating a good-looking Cinepak movie involves balancing numerous settings. Remember that in playback Cinepak favors speed over image quality and will drop information to keep to the specified frame rate. Testing and experimentation lead to the best combination for your movies.



Specify Video Settings

Larger frame sizes require more compression to remain within your data rate. The quarter-screen size here—320 by 240 pixels—is about as large as is practical for CD-ROM–based Cinepak movies. Smaller frame sizes allow for faster frame rates or simply less compression, so don't feel compelled to use the quarter-screen size. But do make each dimension an even multiple of 4, since Cinepak operates on 4-pixel cells.

For frames per second, use a number that goes into 30 evenly: 15, 10, or (yuck) 6 or 5. If the movie doesn't contain a lot of motion, choosing 10 fps instead of 15 fps frees up some bandwidth that can yield a sharper movie.

The more keyframes, the better the movie's random-access playback—but more keyframes require more bandwidth, forcing Cinepak to compress remaining frames to stay within your specified data rate.

Generally, specify 1 keyframe per second, as shown here (Premiere 4.2's awkward "Key Frame Rate" wording translates to "Put one keyframe every X frames"). If you want users to be able to skip around quickly within the movie, use more. If random-access playback is unimportant, use fewer—although quality may suffer in movies containing a lot of motion.

Premiere 4.2 only: If you want to start playback from different points—depending, for example, on a game player's actions—create markers at those points and check the At Markers box.

Specify Data Rate

The 260K per second (KBps) data rate shown here is a bit high for a double-speed CD-ROM drive—about 220 KBps is safer. For a quad-speed drive, try a rate in the 500-KBps ballpark. The higher the rate, the sharper the movie—but playback can suffer on slower machines. Best approach: After compressing, burn a CD using a CD-recordable drive, and test the CD on as many machines as possible. Premiere 4.2 only: To analyze the final movie's data-rate requirements, use the Data Rate Analyzer in the File menu's Tools submenu. A funky, unsupported Apple utility, MovieAnalyzer, also does this.

Specify Audio Settings

The higher the sampling rate, the better the sound—but higher bandwidth requirements mean video quality will suffer. For voice, consider an 11kHz sampling rate; the 22.05kHz rate shown is best for music.

Crop, Scale, and Blur

The work you do here can make a big difference. Cropping the movie removes the dancing band of video noise that appears at the bottom of the frame. Blurring helps smooth video noise, improving compression and decreasing file size. Excellent tools for processing include Terran Interactive's Movie Cleaner Pro and Radius's Cinepak Toolkit. Adobe After Effects also does a superb job, particularly with scaling.

Attach a Custom Palette

Many of your customers will have only 8-bit (256-color) video. Creating a custom color palette for the movie eliminates the need for QuickTime to dither the movie during playback, which takes time. A custom palette also yields better color, since all 256 colors will be present in the movie. The standard system palette, by comparison, contains a broader range of colors, some of which may not appear in the movie at all. Thus, a standard palette represents the movie's colors less accurately. You can also create a custom palette using Adobe Photoshop or Equilibrium's DeBabelizer.

remaining within your specified data rate, Cinepak degrades the entire frame's appearance.

In ascending order from greatest to least video noise, the video formats are VHS, S-VHS, Hi-8, and Betacam SP.

• *Light indoor subjects.* Today's video cameras are very sensitive to low light, so you can make movies where you previously could not, but the video noise is also far more apparent in low-light shots. Rather than relying on existing room lighting, invest in at least one video light—not a home-movie job that mounts atop the camera, but a high-quality halogen light with a stand and reflective umbrella. The resulting video will be cleaner and free of the odd color casts indoor lighting can produce. I use Omni lights from Lowel-Light Manufacturing (718/921-0600); you can find these or similar lights at photography- and video-supply houses. To learn to use your lights, read Ross Lowell's *Matters of Light and Depth* (Broad Street Books, 1992).

• *Shoot with compression in mind.* Choose plain, solid-color backgrounds, use a tripod, and avoid excessive panning and zooming. Now, cinematographers might balk at restricting their repertoire to shots that compress well, but know that busy backgrounds and lots of movement will cost you in sharpness—as the sample images on these pages show. (You can see full-size, unhalftoned versions of these images on my Web site, at *http://www.mcn.org/heidsite.*)

Capture Tips

The digitizing process also affects a movie's quality. Again, higher-end hardware gives the best results. Using a disk array and SCSI accelerator card with high-end gear yields cleaner video than does using a single, high-capacity drive; because a faster storage device is better able to keep up with incoming video, you can use lower compression ratios.

If you use high-end gear, set the device's black level so that black areas of the image are pitch black. This reduces video noise. You can adjust black levels and other settings in the Image portion of QuickTime's standard Video Settings dialog box. Low-end digitizers, such as those in AV Macs, do not allow for black-level adjustments, although you can do some good by tweaking their brightness settings.

Tip: You can evaluate black-level or brightness adjustments with Adobe Photoshop's Histogram command. Convert a frame of captured video to a PICT image (Adobe Premiere's Frame to PICT command is handy for this), open it in Photoshop, and choose Histogram. Look for a broad distribution across the graph; if the data falls off near the black or white ends, tweak your digitizer's black and white levels and try again.

Compression Tips

After capturing and editing the video, you're ready to compress it for CD playback. For years, CD producers used a free Apple utility named MovieShop to do Cinepak compression. It yields great quality but is buggy and a pain to use.

Adobe has added excellent CD-ROM movie-preparation features to Premiere 4.2, and Terran Interactive (408/353-8859) has released a slick $129 compression utility called Movie Cleaner Pro. Movie Cleaner Lite, a basic version of the program, is available as shareware. And as I write this, Radius is putting the final touches on its promising Cinepak Toolkit utility.

What makes a good compression utility? First, a batch-compression feature—Cinepak compression is so slow that you'll want to queue up some movies before calling it a day. But equally important is support for the little tricks that enhance Cinepak movie quality: cropping, blurring, and palette optimization.

If you have the marvelous Adobe After Effects you can use it to do your cropping, blurring, and scaling. After Effects' resizing algorithms are so superb that Adobe incorporated them into Premiere 4.2. When you check the Better Resize box in the Make CD-ROM Movie dialog, Premiere uses these superior resizing techniques. (Both After Effects and Premiere are reviewed in this issue.)

Fade Out

Even if you apply all these strategies, you may still see your tack-sharp video reduced to dancing pixels after compression. One way to minimize quality loss is to specify a data rate of about 500K per second in your compression utility. The results will be virtually unplayable on a standard 2× CD-ROM drive, but they'll look good on a 4× drive. The downside is that requiring a 4× drive significantly shrinks your potential market. To avoid this, some developers include multiple versions of each movie; the title's front-end software determines the appropriate movies. Besides being hard to implement, however, this scheme dramatically increases the amount of space your title takes up. Until 4× drives represent the majority of the installed base, most of us will simply prepare movies with 2× drives in mind. **m**

Next month: Tips for great multimedia sound

CINEPAK DO'S AND DON'TS



How not to shoot for Cinepak A busy background and dim fluorescent room lighting lead to a chunky movie with a green cast. Also note the barely visible skewed strip (see bottom of sleeve, at left). This is video noise that always appears when you digitize from tape; it's always in motion, too, causing additional compression problems. Crop it out.



How to shoot for Cinepak A reflector-mounted halogen video lamp and plain background (this is photographic background paper in the Studio Blue color) make for cleaner video that compresses well. This clip was also cropped, resized, and Gaussian blurred in Adobe After Effects. Both clips have the same data rate: about 250K per second.

Contributing editor JIM HEID (*jim_heid@macworld.com*) produced the CD-ROM that accompanies his *Macworld New Complete Mac Handbook*, fourth edition (IDG Books Worldwide, 1995).

Publishing Workshop

Faster Printing through Flatness

by Steve Roth

"PostScript error: limitcheck; offending command: stroke." Ever see this message? Or has your service bureau reported it to you? It's one of the great showstoppers of desktop publishing. The job is done, the press is waiting, and you can't get your film out.

If you have faced this particular bugaboo, you'll be happy to know that there are easy ways to avoid it, while speeding up printing immensely. It all has to do with flatness.

Everybody knows that PostScript devices can draw smooth curves; that's why we like them so much. But most people don't know that those smooth curves put big demands on the PostScript interpreter (the software in the printer's raster image processor, or RIP). The higher the device's resolution, and the longer the path, the harder—and slower—it is to render.

Set Flat and Relax

To make life easier for your long-suffering RIP, tell it to relax a little: "Don't bother making those curves as smooth as possible; go for lots of little straight lines to form the curve. It will save you lots of effort, and we can't see the difference anyway."

The PostScript command that imparts that soothing message is the *setflat* operator.

The setflat operator tells the PostScript device how closely, in device pixels, it needs to approach that Platonic ideal of the perfect curve. The default flatness setting for most PostScript interpreters—what you get if you don't tell them otherwise—is 1, meaning they should get within one pixel. A setting of 3 means it can deviate from the true path of righteousness by three pixels (see "Walking the Line").

Here's a simple rule: To speed up printing (lots) and avoid output problems (some), with minute or invisible differences in output (except on some color printers), always set flatness to 3. ■

Contributing editor STEVE ROTH is the editor, most recently, of *Real World Photoshop 3* (Peachpit Press, 1996).

Walking the Line

The smoothness of printed curves depends on the flatness setting and the resolution of the printer. Flatness divided by resolution tells you how far, in inches, the printed line will deviate from the ideal.



LASER PRINTER OUTPUT (GRAY-SCALE COMPOSITE): 600 DPI



Flatness: 1
Maximum deviation: 1/600
Printing time: 154 seconds



Flatness: 3
Maximum deviation: 1/200
Printing time: 112 seconds



Flatness: 50
Maximum deviation: 1/12
Printing time: 87 seconds

IMAGESETTER OUTPUT (FOUR SEPARATIONS): 2400 DPI



Flatness: 1
Maximum deviation: 1/2400
Printing time: 938 seconds



Flatness: 3
Maximum deviation: 1/800
Printing time: 696 seconds



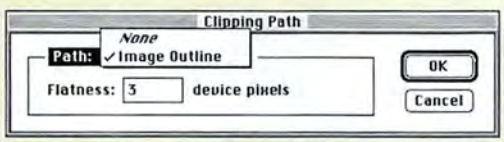
Flatness: 50
Maximum deviation: 1/48
Printing time: 342 seconds

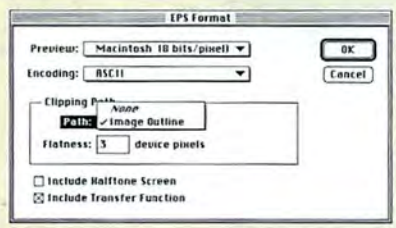
How to Set Flatness Controls

ADOBE PHOTOSHOP

THE ONLY TIME THAT FLATNESS IS IMPORTANT IN PHOTOSHOP IS when you're saving clipping paths, usually in EPS files. (Photoshop can save clipping paths in TIFFs, but at present, PageMaker 6 is the only program I know of that acknowledges their existence.)

There are two places to select a path that Photoshop will use as the clipping path when saving an image—the Clipping Path command in the Paths palette pop-up menu, and the Clipping Path portion of the EPS Format dialog box. Each provides an option to set flatness for the clipping path.





MACROMEDIA FREEHAND

IN FREEHAND (VERSION 4 AND LATER) YOU CONTROL FLATNESS (BOTH for printing and in exported EPS files) via the Output Options dialog box. You can set the default for new documents by changing the FreeHand Defaults template in the FreeHand folder. You can also control flatness for selected objects via the object Inspector.





ADOBE ILLUSTRATOR

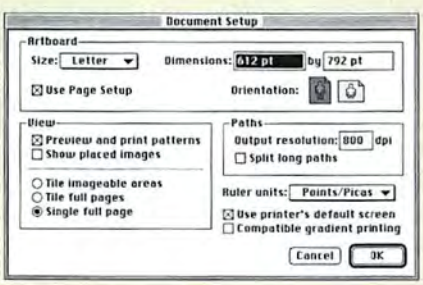
ILLUSTRATOR CALCULATES THE FLATNESS SETTING FOR YOU BASED on your device's actual output resolution and the Output Resolution setting you specify using the Attributes command on the Object menu. You can set the default Output Resolution for all newly created objects in the Paths section of Document Setup. The factory default setting for new objects is 800.

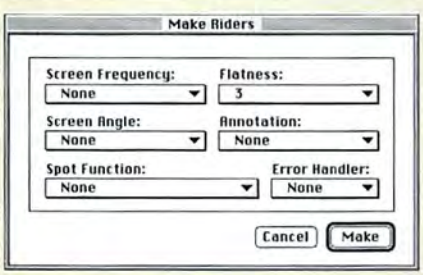
This setting actually specifies a deviation from the ideal. With the default setting of 800, lines can deviate by 1/800 inch—no matter what type of device you print on.

The flatness setting that you get when you print is the actual device resolution divided by the Output Resolution setting. With the default Output Resolution setting of 800, printing on a 300-dpi printer results in a flatness setting of .375. Printing on a 2400-dpi imagesetter results in a flatness setting of 3.

You can control flatness explicitly for a file (globally, for both printing and EPS saves) using the Riders plug-in, which is hidden in the Riders folder in the Separator & Utilities folder. Move the Riders plug-in to the Plug-Ins folder, then restart Illustrator. Choose Make Riders from the Other submenu of the Filter menu and you get a dialog box in which you can control several printing-related specifications, including flatness.

When you click on Make, the Riders plug-in creates a file called Adobe Illustrator EPSF Riders, which must be stored in the Illustrator Plug-Ins folder. This file gets tacked on to the PostScript stream whenever you print or save from Illustrator, overriding the automatic flatness setting that Illustrator generates.





ADOBE PAGEMAKER

THERE'S A LITTLE-KNOWN FEATURE OF PAGEMAKER (VERSIONS 5 AND 6) that lets you create a PostScript file that PageMaker sucks into the PostScript stream whenever you print.

Create a text-only file that contains one line—**3 setflat**—name it **p6after.ps**, and put it in the RSRC folder in the PageMaker folder. (If you're using PageMaker 5, name the file **alafter.ps** and put it inside the System:Aldus folder.) If there's already such a file, just add that line at the end. From then on, every time PageMaker prints, it includes that flatness setting in the print job.

QUARKXPRESS

IT'S NOT AS PERMANENT IN QUARKXPRESS AS IT IS IN PAGEMAKER, but it's just about as easy. Print a QuarkXPress document to disk, open the PostScript file in a text editor, and add the line **3 setflat** right after the **%%EndComments** line near the top of the file. Then save the file and download it. It's an extra step, but if the press date is looming, it's a nice bit of insurance to make sure the job rolls out of the imagesetter.

Graphics Workshop

Using Channels as Layers to Apply Subtle Effects

by Cathy Abes

ARTIST: Art Rice is a New York–based art director and designer whose posters have appeared in the National Gallery of Fine Art in Washington, D.C., and elsewhere in the United States and Europe.

HOW IT WAS DONE: Rice's objective was to colorize and composite black-and-white photographs of nineteenth-century Native Americans while preserving the photos' old-fashioned look. Rather than using Photoshop's colorizing tools in the usual way, which he felt would rob the photos of their authenticity, Rice used channel operations to subtly manipulate the images without sacrificing detail.

He began by scanning the three photos in Grayscale mode and converting the largest one to RGB to divide it into channels. After applying a filter to that photo, he cleared the red channel so he could use it as a layer for compositing the smaller photos with the large one. Using the eraser and the Levels command, he silhouetted the kneeling Indian on the right.

To create the ceremonial drum element the Indian appears to be holding, Rice used the circle marquee to create two circles to which he added two gradient fills going in different directions. He then placed each of the small photos in the cleared red channel and positioned them, periodically switching to the RGB channel to preview the entire image. Putting the small photos in the cleared red channel after applying the Canvas filter kept the filter from affecting them directly.

Applying the Lighting Effects filter with Light Type set to Spotlight and Texture—in the green channel only—set to Mountainous produced an embossed effect on the selected areas. **m**



1 Rice scanned the photo that became the centerpiece of his image in Grayscale mode, then converted it to RGB so he could work within channels. Although he now had red, green, and blue channels, each channel contained the same data because the image was still in gray scale.



2 Rice applied the Canvas filter from Adobe Gallery Effects to the large photo to give it a rough texture.



3 Using the Clear command (Edit menu), he removed the image from the red channel and saved the cleared channel so he could drop the smaller images into it, superimpose them on the main image, and manipulate them. With the red channel cleared, the image now looked red when viewed in RGB.





5 This is how the composited image would have looked if Rice had applied the Canvas filter to all three photos. Because the two smaller photos were in the background and not nearly as prominent as the large one, Rice felt applying the filter to them would mean losing detail and degrading the images.



6 Because he cleared the red channel after applying the Canvas filter and then placed the small photos in the cleared channel, Rice effectively used the filter as an overlay—it subtly altered the appearance of the background images without actually changing any of their pixels, thus preserving details.



4 After dragging the two smaller photos into the red channel of the large image and positioning them relative to the large photo, Rice periodically made the RGB channel visible so he could preview the entire image, returning to the red channel to make the necessary adjustments.

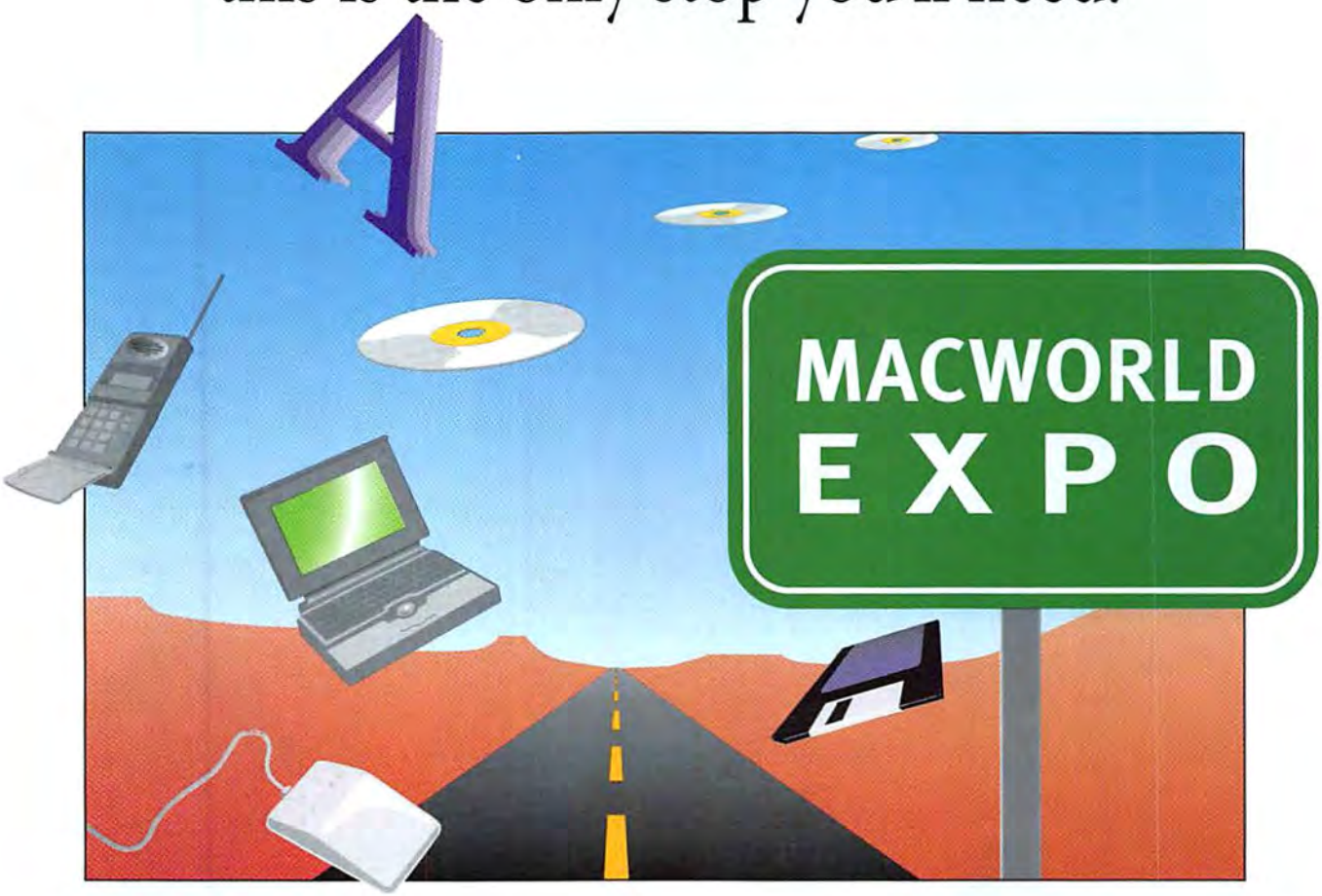
THE TOOLS

Hardware: Power Macintosh 8100/100 with 48MB of RAM and a 700MB internal hard drive; Radius Intellicolor 20e color monitor; SyQuest 44MB removable-cartridge drive; Umax uc630 color scanner; Apple QuickTake 100 digital camera; HP LaserJet 4m; Tektronix Phaser III.

Software: Adobe Photoshop 3.03; Adobe Gallery Effects 1.0.

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Buyers' Tools

Multimedia Speakers

COMPLETE YOUR MULTIMEDIA MAC WITH STEREO SOUND

by Gene Steinberg



ROBERT PERRY

The Mac is billed as the premier multimedia computer, only you wouldn't know it by the speakers in the typical Mac. You're lucky if they sound as good as a clock radio. But if you're creating a presentation, or just want to listen to your favorite CDs, having a good sound system hooked up to your Mac is a real plus.

Sound quality is the overriding factor in choosing a multimedia loudspeaker system. You want to feel the earth (or at least the floor) tremble as you move from one land to another when you play Brøderbund's Myst. You want to hear electric guitars wail and cymbals clash and drums thump when you play Springsteen. You want to accurately portray sounds you've captured in your multimedia authoring program.

But choosing speakers for your computer is not easy, especially if you primarily buy via mail order. There are dozens of systems, ranging from less than $50 to just shy of $700. How can you make sure you get one that sounds more like a concert hall than a closet?

The Subject Is Noises

In order to help you identify the best, *Macworld* assembled a lineup of 19 computer speaker systems. To see how they rated, we compared them with a high-end stereo system. Alas, because there's little consistency in the way manufacturers apply specifications to their speaker systems, we paid more attention to features and sound than to specs.

We recruited a small listening panel to evaluate tested products and to compare them with our reference system. The panel included Barbara Steinberg, a classically trained pop singer (and the author's wife), and Ted Alspach, a multimedia aficionado who also wrote the *Macworld Illustrator 5.0/5.5 Bible* (IDG Books Worldwide, 1994).

Since most of the sounds you hear in games and screen savers are synthesized, and sometimes they're of low quality, we used a selection of audio CDs to judge sound quality. To prevent visual clues like size and nameplate from biasing our panel, we used blind testing when necessary.

Computer speakers pose some special manufacturing problems. Because speakers sit near a monitor, they must be magnetically shielded to prevent color distortion or flickering images on screen.

Sound reproduction is another challenge. Stereo speakers are designed to be spread out from each other, and from listeners. The sound you hear is a combination of signals emanating from the speakers themselves, plus sounds bouncing off your walls and furniture. Speaker designers take these reflections into account when *voicing* speakers, adjusting their tonal balance. In contrast, a computer speaker must accommodate what's known as *nearfield* listening, which means the listener is just a few feet away. In this situation, reflected sound contributes less to

what you hear. A regular speaker this close would probably be too loud and fatigue your ears over an extended period.

The speakers we tested included a number of no-frills desktop-only designs. One model, the Labtec LCS-3210, offered a pseudo–3-D, or surround-sound, effect called Spatializer—which failed to impress us, because it added distortion as well as 3-D attributes. At the other end of the spectrum were three-piece designs containing two desktop speakers (usually called cubes or satellites) and a separate woofer system that fits under a desk or behind furniture.

Some manufacturers had separate woofers and tweeters in their desktop speakers; others used a single speaker for the entire audible range. But there didn't appear to be a distinctive sonic advantage of one setup over another. As a matter of fact, the highest-rated speakers tended to come in the smallest packages.

How Low Can You Go?

In order to pump more bass out of a small box, many of the manufacturers use *ported designs*, a technique that involves funneling the sound through a hollow tube to reinforce low-frequency reproduction. But by far the best way to improve bass is to add a separate woofer module. Although these modules are sometimes referred to by the manufacturers as subwoofers, they don't truly fall into the subwoofer category. At best they give you low frequencies down to 40Hz to 60Hz, which is what most normal stereo speakers provide. A real subwoofer normally offers reproduction below 40Hz. However, these woofer modules did add richness to the sound, and bass notes generally took on extra weight, not only in our favorite computer games, but in our audio CDs too.

If you're on a budget, consider one of the top-rated desktop-based systems for now, and add a subwoofer later to enhance low-frequency reproduction. To see how adding a woofer improved those systems, we took the subwoofer that comes with the Yamaha YST-SS1010 and attached it to some of the low-cost desktop-only systems we tested. In every case, the sound took on a richness that was lacking when even the best of those systems were used by themselves.

Installing multimedia speakers is pretty straightforward. Check which desktop speaker goes to the left and which goes to the right, hook up a few cables, turn the speakers on, and you're ready to boogie. Most manufacturers substitute slim brochures for spiral-bound manuals (Midi Land's instructions are on the side of a box). But adding a woofer is more complex, because you need advice on proper placement for best sound. We commend Advent, Bose, and Cambridge SoundWorks for providing well-illustrated instruction books with sensible recommendations. Although Advent takes the folded-paper approach, its brochure does offer a few paragraphs of advice for hooking up the woofer module of its AV622 Powered Speakers. Yamaha provides no information whatever on the best location for the woofer portion of its YST-SS1010.

Sounds Like

When all is said and done, it's the sound that counts. And here many multimedia loudspeakers come up short. During the tests, our ears were assaulted with harsh sounds, boomy bass, and voices that sounded as if they originated in the bottom of a barrel. Reproducing the audible spectrum clearly and accurately is not an easy task, and most of the speakers in our survey fell short. Only a few were suitable for a small audio system; some didn't

Lend Us Your Ears

Company	Product	Star Rating *	List Price	Company's Estimated Street Price
Advent	AV270 Powered Speakers	★★/4.9	$179 (pair)	NP
	AV622 Powered Speakers	★★★/6.2	$299 (3-piece)	NP
Altec Lansing	SurroundSound ACS 500	★★★/5.7	$450 (3-piece)	$399 (3-piece)
	ACS 52	★★★★/7.1	$128 (pair)	$99 (pair)
Apple	AppleDesign Powered Speakers	★★★/6.8	$179 (pair)	$169 (pair)
Audio-Technica	MMS 557	★★★★/7.5	$150 (pair)	$100 (pair)
Bose	Acoustimass	★★★★/8.8	$699 (3-piece)	NP
	MediaMate	★★★★/7.8	$339 (pair)	NP
Cambridge SoundWorks	SoundWorks	★★★★/7.9	$220 (3-piece)	NP
Jazz	J-688AV	★★★/5.2	$149 (pair)	$119 (pair)
	J-902	★★/4.7	$150 (3-piece)	$120 (3-piece)
Jensen	JPS 45	★★★/5.8	$149 (pair)	NP
Koss	SW150	★★/3.7	$180 (3-piece)	NP
Labtec	LCS-3210	★★/3.5	NP	$119 (pair)
Midi Land	MLi-95	★★★/6.6	$120 (pair)	NP
Multimedia Labs	TC1490-7SUB	★★★/6.4	$249 (3-piece)	NP
Radio Shack	AMX-16	★★★★/7.1	NP	$120 (pair)
Roland	MA-12CP	★★★/6.2	$319 (pair)	NP
Yamaha	YST-SS1010	★★★/6.4	$350 (3-piece)	$250 (3-piece)

NP = not provided by company * *Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See*

Phone Number	Warranty	Comments
708/317-3700	2 years	Clean and smooth. Somewhat tinny quality to midrange and highs.
708/317-3700	2 years	Clean and smooth, with somewhat lightweight character. Slight treble emphasis. Bass has reasonable weight and impact.
717/296-2818	1 year	Robust sound, slightly smeared highs, and slight harshness when played at loud volume. Bass is powerful, but a bit boomy.
717/296-2818	1 year	Clean, reasonably solid presentation; crisp highs. Bass is very powerful for such a small design. Ported design.
408/996-1010	1 year	Clean, reasonably solid presentation, with good inner detail and high-frequency sound. Bass is good but doesn't shake the foundations.
216/686-2600	1 year	Relatively clean, slightly bright, crisp sound. Surprisingly robust bass for a small box.
508/879-7330	1 year	Full, rich, natural sound. Treble slightly rolled-off but clean.
508/879-7330	1 year	Full, warm, rich, natural sound. Cymbals had considerable clarity and detail and sounded very realistic. Amazingly robust for such a small speaker.
617/332-5936	1 year	Clean, well-balanced sound. Slight upper-midrange emphasis. Good bass.
818/336-2689	2 years	Reasonably smooth sound, noticeably rolled-off high end; slightly harsh midrange becomes a bit fatiguing over a long listening session.
818/336-2689	2 years	Clear reproduction. Moderate bass and overemphasized treble. Generally thin sonic character because of the high-frequency emphasis.
708/317-3700	5 years	Clean, reasonably crisp, slightly bright; an almost sandpapery effect on cymbals. Adequate bass, somewhat lacking in low-end heft. Voices sound as if they originate from the bottom of a barrel.
414/964-5000	lifetime	Weak bass. Harsh midrange. Rolled-off treble. No saving graces.
360/896-2000	1 year	Decent, slightly boomy bass. Harsh midrange. Rolled-off treble. Sound gets harsher at loud volumes.
909/592-1168	lifetime	Surprisingly good sound for the money. Clean, reasonably clear; fine musical details a wee bit indistinct. Good voice reproduction. Adequate bass. Smooth highs; accurate presentation.
410/429-4300	90 days	Clean sound and thin balance. Adjusting subwoofer output just makes bass boom, but bass is always lightweight.
817/390-3300	90 days	Clean, reasonably crisp, slightly bright, decent bass. Somewhat lacking in low-end heft.
213/685-5141	90 days (labor) 1 year (parts)	Relatively warm, well-balanced sound. Slightly lightweight bass. Tends to sound harsh when played at normal volume levels.
714/522-9240	1 year	Relatively warm, well-balanced sound. Slightly rolled-off treble, with slight smearing effect on cymbals. Average bass impact with subwoofer. Tends to sound harsh when played at loud volumes.

Star Ratings *section for full explanation.)*

even match the quality of a boom box.

None of the speakers could compare with our reference system (which was designed for a large room). But when you consider that these computer speakers were much less expensive than that system, the best of them could deliver some mighty satisfying sounds indeed, definitely suitable for a small listening area.

Most of the systems we tested seemed to be designed with the assumption that you'd be using an internal CD drive with your Mac. While that's true of the newest models, millions of Macs out there have external CD drives. If your Mac is in that category, you'll find that audio CDs don't play back on a speaker system hooked up directly to your Mac. You need a separate input (available at electronics stores) for your CD or other sound source.

The Last Word

When it comes to high-quality multimedia loudspeakers, the well-known stereo-speaker manufacturers know how to get it right.

Our top-rated three-piece system was the Bose Acoustimass multimedia speaker. Although its desktop speakers are diminutive 3-inch cubes, the system provided a rich, full sound with excellent bass support and realistic reproduction of acoustic instruments. It does just about everything well and would also serve a small stereo system (but don't expect it to play at high volumes without protesting). However, it's expensive, costing nearly twice as much as any other system we tested. If you aren't ready to cough up nearly $700 for a computer speaker system, you'll find SoundWorks from Cambridge SoundWorks a credible alternative. It's small, yet it had good bass and crisp sound, and costs just $220. It doesn't have a separate input for an external CD player, however.

When it comes to desktop systems, a Bose product reigns supreme again. The $339 MediaMate had a full-bodied sound that was close enough to its high-end sibling's that we seldom felt the loss of a separate woofer. If you're on a budget, however, you'll want to take a look at the Audio-Technica MMS 557 and Altec Lansing ACS 52, either of which will set you back no more than $100 or so. Both speakers provided crisp sound and decent bass for such small desktop designs.

And if you already have a high-quality stereo system in the same room as your computer, look no further for a solution to your Mac's audio deficiencies. Just hook up an audio cable from your Mac to your system, pop in your favorite CD, relax, and enjoy. m

GENE STEINBERG is leader of the Mac Multimedia Forum on America Online.

MULTIMEDIA SPEAKER SYSTEMS

MW EDITORS' CHOICE We listened closely in order to judge speakers on their sound quality, price, and ease of setup.

Desktop Speakers

★★★★/7.8 **MediaMate** Top-notch sound gets top honors. **Company:** Bose. **List price:** $339.

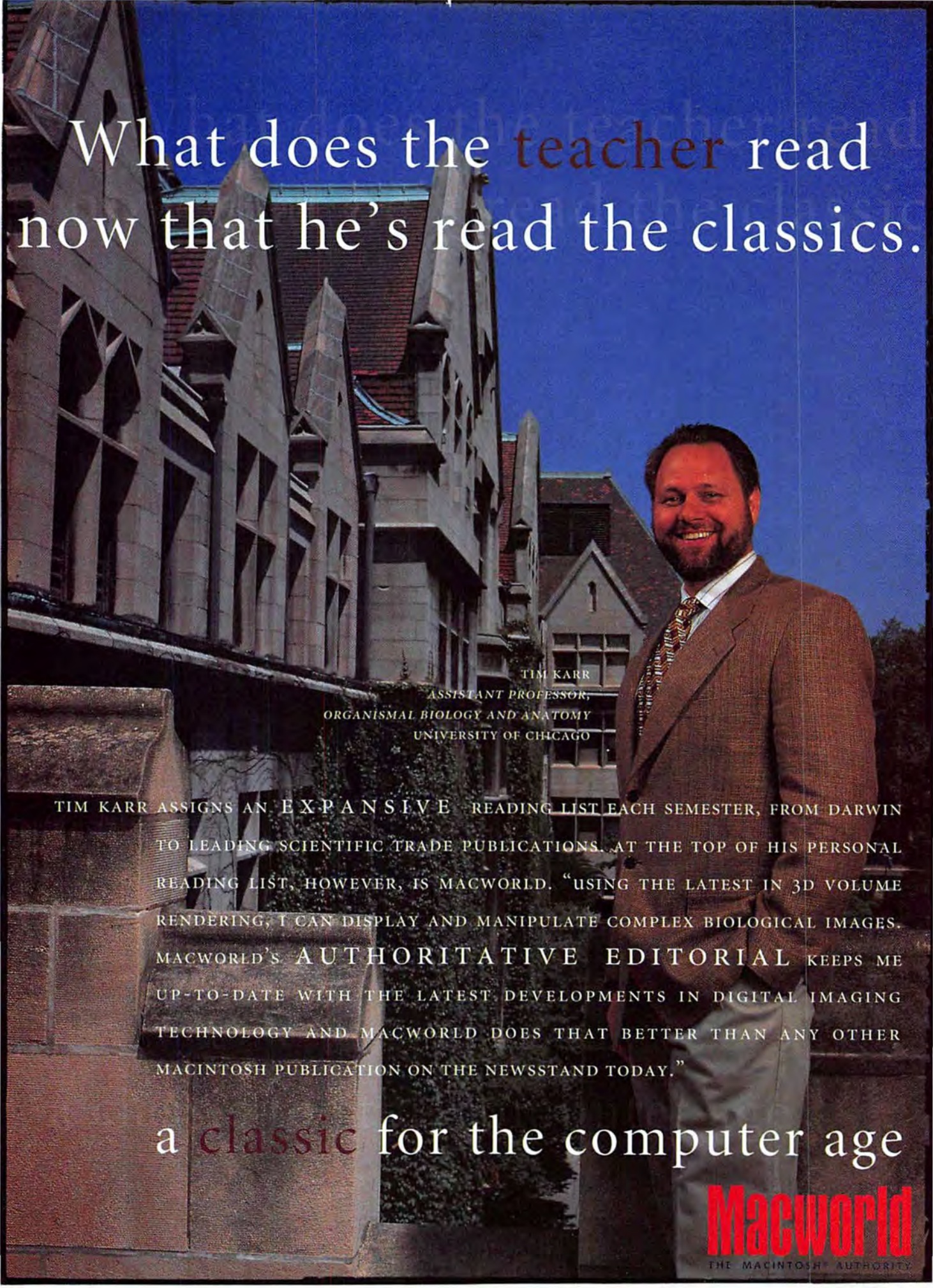
Three-Piece Speakers

(High- and Low-End)

★★★★/8.8 **Acoustimass** Sound comparable to a standard stereo system. **Company:** Bose. **List price:** $699.

★★★★/7.9 **SoundWorks** Small, yet delivered good bass and crisp sound. **Company:** Cambridge SoundWorks. **List price:** $220.

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ASSISTANT PROFESSOR,
ORGANISMAL BIOLOGY AND ANATOMY
UNIVERSITY OF CHICAGO

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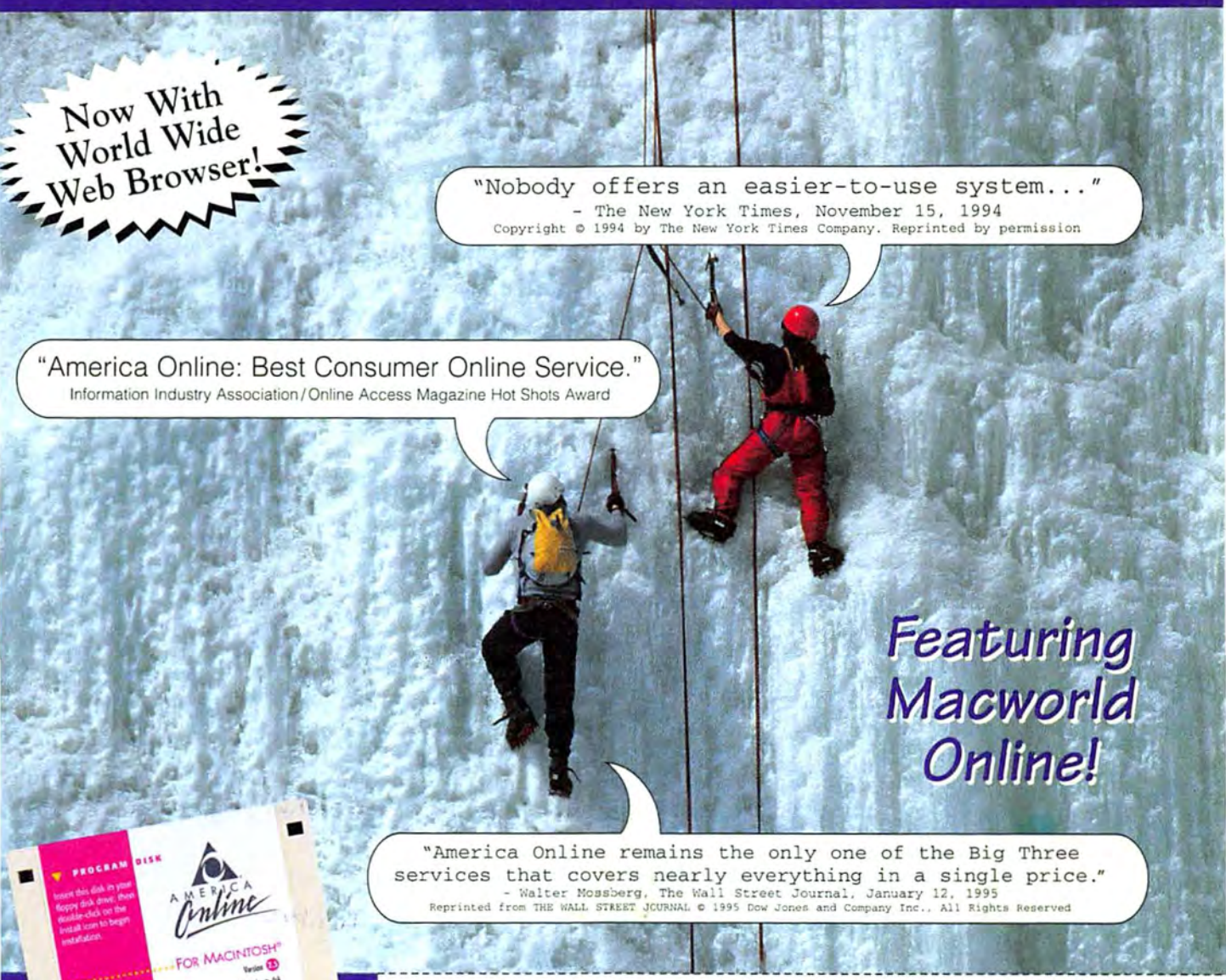
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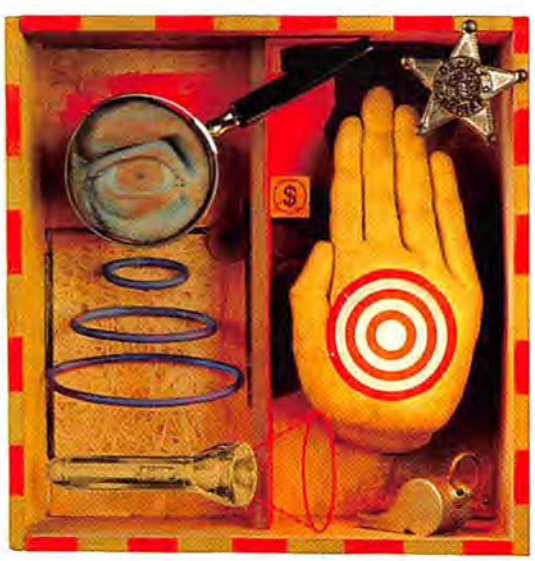
MACWORLD READER Robert Barowski wrote to *Consumer Advocate* describing a recent purchase discovery. After purchasing a PowerBook Duo 280 through a local retailer, he noticed a mysterious extra charge on his Visa statement. It seems he was charged a service fee by the retailer for using his credit card. A very upset Borowski disputed the charges by sending a copy of the invoice, with the service-fee line circled, to Visa. A few weeks later Visa credited his account for the fee amount (over $100 in this case).

Anyone flipping through the ads in *Macworld* or any other computer magazine will see many with a telltale line—"prices are cash discounted"—near the telephone number in very small print. Other mail-order companies boast, usually in larger type, "no surcharge!" *Macworld* has always recommended using a credit card when buying through mail order because of the greater protection it affords against fraud. But that extra assurance comes at a cost. I called several companies listed in the back pages of *Macworld*. Ironically, the companies who do not distinguish between credit card and cash purchases charge, on average, 6 percent more than the cash price from companies that do distinguish them. For the person buying an entire system, or buying to outfit an office, the surcharge skyrockets the overall purchase price.

Can retailers charge you for the privilege of using a credit card? Yes and no. According to the nonprofit Bankcard Holders of America, Visa, MasterCard, and American Express each prohibit such surcharges in their contracts with merchants. The Visa representative I spoke with agreed that businesses can't charge you extra for credit card purchases, but they *can* charge you less for paying cash. Hmm. The Visa representative went on to explain that, just like many service stations that offer discounts for cash purchases, some mail-order businesses use the cash-discount strategy as a loophole to recoup what banks charge them to process credit card purchases. If your invoice specifically lists a credit card service fee or service charge, you can dispute it; with the cash-discount strategy, no service fee or service charge appears on your invoice, so the charge is considered valid, and you are out of luck.

Clip and Save

How can you as a thrifty shopper resolve this credit card quandary? By doing what you should always do—shopping wisely. The following are a few pearls of wisdom that I gleaned from using the back pages of *Macworld*.



Ask First, Buy Later Several companies do charge less for cash purchases, though their ads don't bother to mention it. Several stores quoted me the cash-discount price over the phone without telling me it was a cash-only price. Always ask if the price being quoted is the cash or the credit card price. Ask if the company will fax you the quote, too—a price you're offered one day may not be around the next.

Use Your Phone Almost all mail-order companies have a toll-free line, so what's stopping you from using it? Call every company with an ad for the product you want—persistence pays off. The third company I called quoted a great price on an Apple LaserWriter 4/600—$829—if I was willing to pay in cash. However, 27 calls (and companies) later, I found a vendor who was willing to sell me the same printer via credit card for $839—an entirely reasonable deal.

Bargain Another company quoted me an $829 cash price, $850 with a credit card. When I grumbled, the sales rep dropped the price for a credit card purchase down to the cash-only price. Again, be sure to get all such special-deal quotes in writing.

Figure the Total Price Remember that a cash discount is just one way to get a lower price. If you order from a mail-order company located out of state, you usually won't pay any sales tax. Shipping charges vary, too. Add up all the charges to find the real bargains. That cash-only bargain might not seem so attractive with $69 in tax and $28 in shipping costs added on, if, say, another vendor's price is $40 higher but it charges only $10 shipping and no sales tax.

Lastly, all of us who make big-ticket buying decisions—whether your budget's $50 or $5000—should listen to the Boy Scouts and *be prepared*. Know the company you're dealing with, or at least check its standing with the Better Business Bureau and your local user group. Use the four tips we've listed here. And let us know when you encounter a Macintosh company Saint or Sinner.

continues

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1.0 MB	1.68	3.87	7.87

*Test conducted on a Power Macintosh 8100/100AV for PowerCADD 2.0 and a Macintosh Quadra 630 for PowerDraw versions.

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Macworld October 1995
"...PowerCADD's greatest benefit is speed..."
"PowerCADD does the best job of harnessing the Power Mac's capabilities I've seen."

MacUser October 1995
"...PowerCADD's programmability and extensibility may make PowerCADD a better choice than high-end CAD programs."

score card MacWEEK ◆◆◆◆
MacWEEK July 10, 1995
"...a 1.4 MB (PowerCADD) file on the Power Mac updated more than two times faster on the Power Macintosh (redraw speed of five seconds)."

InfoWorld July 24, 1995
"PowerCADD 2.0 boasts faster redraw times, faster editing and processing speeds, improved layer controls, enhanced editing commands, and a redesigned interface."

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If you would like to obtain further information about your rights and responsibilities as a credit-wielding citizen, visit or call these consumer resources.

Visa (*http://www.visa.com/visa/*) Information on credit card rules, regulations, and rights, plus phone numbers for credit counseling, profiles, and what to do if your card is lost or stolen.

MasterCard (*http://www.mastercard.com/home-g.htm*) MasterCard FAQs, plus foreign currency exchange rates, ATM locations worldwide, and information on protecting your card and credit rating.

Better Business Bureau (*http://www.igc.apc.org/cbbb/*) Lists programs, services, and publications for both consumers and businesses. Also FAQs, a member directory, and links to local branches.

National Consumers League (202/835-3323) Answers general questions on consumer issues and can refer callers to specific organizations, such as those listed below.

Bankcard Holders of America (540/389-5445) Nonprofit organization answers consumers' questions regarding credit card issues.

Federal Trade Commission (202/326-2222) Offers free publications regarding consumer rights.

National Foundation for Consumer Credit (301/589-5600) Another nonprofit outfit with over 700 local offices, answers financial and consumer-related questions.

Letters

A Delicate Subject Does anyone have a source for mouse balls? One of my responsibilities is to a northern Michigan school district with about 125 Power Macintoshes. The school district recently asked me to replace four mouse balls that had either been stolen or vandalized, as well as order an additional four as spares. I was told by an Apple dealer and Apple Computer itself that I must purchase a new mouse if the ball inside is lost. It seems inconceivable that I cannot pur-

continues

Bugs and Turkeys



Educators, take note—if you have upgraded your Macintosh but have not upgraded your software, you will have trouble installing Microsoft Works 3.0. Microsoft has rewritten the installer to recognize the newer Macs (owners of MS Works 4.0 already have the latest installer); call Microsoft at 206/635-7160 and request a new, no-cost Installer Disk #1.



Upgrading to QuickBooks Pro 3.1 gives you new features but deletes your QuickBooks 3.0 report-formatting preferences. Intuit tech support says there is no workaround and it's not a bug. Many other programs preserve existing preferences files during upgrades. Intuit should also. Intuit, 415/322-0573.



Wacom promised a patch of its ArtZ II with Erasing Pen tablet for users wanting to use the pen with Painter 3.1 on 680X0 Macs. Now Wacom says that it can't deliver on that promise because Fractal Design, which just released Painter 4.0, won't supply a patch. The pen erases with Painter 4.0; users can buy the upgrade for $129 (it's free if you bought the program after September 1, 1995). Wacom, 360/750-8882. Fractal Design, 408/688-5300.



QuickMail 3.5 lets you create a password with a modified character such as µ (option-m). Using special characters improves security by making it harder for others to guess your password. But when you later try to log in, QuickMail doesn't let you enter that modified character and thus prevents you from reading or sending E-mail. Now that's access security. CE Software, 515/221-1801.

Macworld will send you a Bug Report or Turkey Shoot T-shirt if you are the first to inform us of a turkey or a serious, reproducible bug that we report in this column. See How to Contact Macworld



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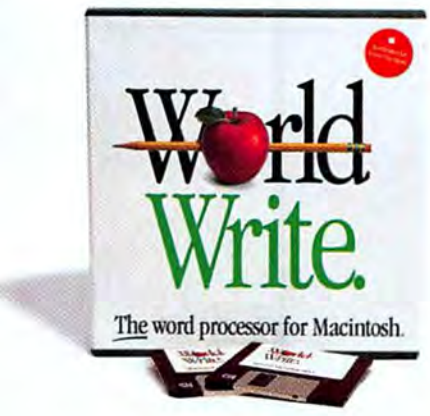
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Adobe Premiere 4.2 + LogoMotion 1.5 Premiere 4.0 owners can upgrade to Premiere (Mar 96 ★★★★/7.4) deluxe CD-ROM, which includes the $179 animated 3-D–logo generator (Nov 94 ★★★★), for $29. Call Adobe, 415/961-4400.

Apple MessagePad 120 (Mar 96 ★★★★/7.5) $100 rebate to owners of earlier models who buy the Newton 2.0 operating system. Call Newton Information Service, 800/909-0260.

CPU Doubler $79.95 performance-enhancement utility plus free copy of $26.95 Cron Manager chronological event-management utility available for $47.95 (check or money order to P.O. Box 380814, Cambridge, MA 02238). Call Orchard Software, 617/876-4608. *Offer good until 2/29/96.*

DiskGuard 1.5 ASD Software's $129 security software (Mar 95 ★★★★ version 1.0.1) offered to competitive-product users for $55 (order #SID-0111). Call MacWarehouse, 908/367-0440.

FreeHand 5.5 $599 draw program (Feb 96 ★★★★/8.1) for $149 to Canvas or MacDraw users. Call Macromedia, 800/326-2128.

Garden Hose $99 companion collection of nature nozzles available for $39 to users upgrading to Fractal Design Painter 4. Call Fractal Design, 800/297-2665. *Offer expires 2/29/96.*

Kai's PowerTools 3.0 + KPT Vector Effects 1.0 + KPT Convolver 1.0 + KPT Bryce The MetaTools bundle consists of $199 Photoshop plug-in (Feb 96 ★★★★/8.3) and $199 object-oriented filter (Oct 95 ★★★★) collections, $199 Photoshop-compatible filter (Aug 95 ★★★★), and $199 3-D landscape-rendering program (Dec 94 ★★★★), for $379.99 (#77222); or PowerTools and KPT Bryce for $169.99 (#77221). Call MacMall, 800/222-2808, and ask for priority code FF622.

Trapper 2.1 DK&A's $3495 object-based trapping application (formerly Island Graphics' $4495 IslandTrapper) available for $2995, includes free upgrade to version 2.2. Available in English, French, German, Italian, and Spanish. Call DK&A, 800/598-8118.

chase replacement parts for the Apple mouse. Is this true?

DON HAGERL
via the Internet

According to Craig McHale in Apple's Office of Executive Relations, replacement parts for the Desktop Mouse and Desktop Mouse II are available through authorized Apple resellers. Not all resellers will order these replacement parts, however, so you may have to ask around. Replacement parts are available for the ball, the mouse body, and the retainer ring. The original mouse ball (25.4mm and gray) is also available in a ten-pack.

Another reader offered a suggestion for keeping the curious and mischievous from removing the mouse ball in the first place. Use hot glue—as opposed to Super Glue—to secure the retaining ring. Unlike with Super Glue, you can take a hot-glued retaining ring off again (with a lot of work) without damaging the plastic. (My thanks to Brian Calhoun-Bryant in Syracuse, New York, for his assistance on this one.)—S.C.

Service HERO

Saul Sokolsky wrote to us about the exceptional service he received from Supra. Sokolsky recently switched from a commercial online service to an account with a local Internet service provider (ISP). The configuration document he received from his ISP was, as he says, "written mainly for PC users . . . I couldn't get the two control panels properly configured. The ISP's technician was equally in the dark." So was the Apple support technician Sokolsky called. In desperation Sokolsky sent an E-mail to Supra, the maker of his fax modem. The technicians told him about Supra's fax-back system. "Ten minutes later I had a document which outlined a step-by-step procedure, with drawings, that worked perfectly."

SUZANNE COURTEAU, better known as "—Ed." in *Macworld*'s *Letters* pages, has been with *Macworld* for five years.

Not getting the treatment you deserve? Or have you received heroic service? Write to the *Consumer Advocate* department at *Macworld*, 501 Second St., San Francisco, CA 94107; send us a fax at 415/442-0766. **m**

Star Ratings

HARDWARE AND SOFTWARE PRODUCTS AT A GLANCE

Macworld Star Ratings lets you compare Macintosh products based on the authoritative assessments in our reviews and features. The number of stars indicates the product's level of quality; each product also gets a numeric score that provides a more exact assessment of the product's quality within that level. We evaluate seven factors to derive the Star Rating: feature set, design implementation, performance, reliability, ease of use, innovation, and value. We take these evaluations, weight their importance for each class of product, and calculate the final score. The higher the score, the better a product is, even among products with the same number of stars. The following list shows how the ratings and scores relate.

★★★★★	9.0 to 10.0	Outstanding
★★★★	7.0 to 8.9	Very Good
★★★	5.0 to 6.9	Good
★★	3.0 to 4.9	Flawed
★	0.0 to 2.9	Unacceptable

This section also lists products that have been awarded an **Editors' Choice** designation in a *Macworld* product comparison.

If a product has been upgraded since our last assessment, the most recent version number appears in parentheses after the main reviewed version number. To read a full review of any product in the listing, please consult the issue indicated at the end of the listing or search for the product via Macworld Online (keyword *Macworld* on America Online; URL *http//www.macworld.com* on the World Wide Web).

Vendors: Please write to *Macworld Star Ratings*, 501 Second St., San Francisco, CA 94107 to inform us of changes in the version number or list price of your product, or of changes to your phone number.

software

BUSINESS TOOLS

★★ **Adobe Acrobat 2.0 (2.1),** Adobe Systems, 415/961-4400, $195. The font fidelity of this portable-document software is uneven. *Mar 95, p. 59*

★★★ **Adobe Acrobat for Workgroups 2.0 (2.1),** Adobe Systems, 415/961-4400, $1595. Portable-document software for workgroups is inexpensive but resource-intensive. *Mar 95, p. 59*

★★★★ **ArcView 2.1,** Environmental Systems Research Institute, 909/793-2853, ext. 2050, $995. Sophisticated GIS program is easy to customize. *Jan 96, p. 55*

★★★★ **BizPlan Builder 5.0,** Jian, 415/254-5600, $129. Easy-to-use spreadsheet/word processor template creates business plans. *Jun 95, p. 61*

★★★ **Business Plan Writer 6.0,** Graphite Software, 301/984-1100, $99. Proposal-writing template helps create detailed business plans. *Jun 95, p. 61*

★★★★★ **DeltaGraph Pro 3.5,** DeltaPoint, 408/648-4000, $195. Easy-to-use graphing software stands out from the pack. *Jan 96, p. 57*

★★★ **Equate 1.0,** Holosoft, 408/748-9648, $99. Newton spreadsheet is compatible with Excel. *Oct 95, p. 85*

★★★★ **Helix Express 3.03,** Helix Technologies, 708/465-0242, $589. Latest release of visually oriented database adds speed and features. *Sep 95, p. 65*

★★★★ **MapInfo 3.0,** MapInfo, 518/285-6000, $1295. Mapping software includes advanced geographic-analysis and geocoding tools. *Oct 95, p. 66*

★★★ **Meeting Maker XP 3.1,** On Technology, 617/374-1400, $249; $890 for 10 users. Group scheduling program is useful for small and midsize businesses. *Jan 96, p. 69*

★★★★ **Microsoft Excel 5.0,** Microsoft, 206/882-8080, $339. A wealth of powerful features, but huge hardware requirements. *Jan 95, p. 54*

★★★★ **Microsoft FoxPro for Macintosh 2.5 (2.6),** Microsoft, 206/882-8080, $495. The relational database offers fast searching but an uneven interface for users. *Apr 94, p. 56*

★★★ **PhoneDisc 95 PowerFinder,** Digital Directory Assistance, 617/639-2900, $249. CD-ROM–based phone directory is convenient, but must be updated periodically. *Oct 95, p. 91*

★★★ **Phyla 1.0.3,** Mainstay, 805/484-9400, $495. While nonprogrammers can learn to use this object-oriented database, a little SmallTalk or C++ programming background wouldn't hurt. *Aug 95*

★★★ **QuickFigure Pro 2.1,** PelicanWare, 503/221-1148, $49.95. Newton spreadsheet includes charting and linear equation solving. *Oct 95, p. 85*

COMMUNICATIONS/NETWORKS

★★★★ **Apple Mobile Message System,** Apple Computer, 408/996-1010, $549; $19.95 per month. Multifaceted remote-messaging service helps you keep in touch. *Sep 95, p. 74*

★★★★ **ASAP 1.5,** MicroBeam, 813/546-2727, $695; $795 with Windows client program. Convenient utility makes file-transfer operations quick and easy. *Sep 95, p. 72*

★★★ **Claris Emailer 1.0,** Claris, 408/727-8227, $89. E-mail–management program offers impressive features at a good price. *Dec 95, p. 62*

★★★ **CreativePartner,** emotion Inc., 415/812-9000, $1500. Collaboration tool distributes video, sound, text, and graphics over a network. *Jul 95, p. 69*

★★★★ **FileWave 2.1.2,** Wave Research, 510/704-3900, $895. Update LAN users with this easy-to-use software-distribution tool. *Jul 95, p. 63*

★★★ **GrabNet 1.0,** ForeFront Group, 713/961-1101, $19.95. Simple, affordable utility captures Web pages. *Nov 95, p. 85*

★★ **HoloGate 1.0,** Information Access Technologies, 510/704-0160, $500. E-mail gateway is price-rich and feature-poor. *Apr 95, p. 71*

★★★★ **MacAdministrator,** Hi Resolution, 508/463-6956, $395 (10-user pack). Group administration tool is a great helper for network administrators. *Dec 95, p. 75*

★★★★ **Netscape Navigator,** Netscape Communications, 415/528-2555, $39. Web browser is ahead of the pack in terms of features and ease of use. *May 95, p. 69*

★★★★ **NetWorks 3.0.4,** Caravelle Networks, 613/225-1172, $1395 to $2495. Network-monitoring utility is an indispensable tool. *Apr 95, p. 85*

★★★★ **ProTerm Mac 1.0,** InTrec Software, 602/992-5515, $129.95. Communications program is fast, reliable, and stable. *Jul 95, p. 71*

★★★ **QuickMail 3.0 (3.5),** CE Software, 515/221-1801, $199 to $3799. Good for most people, but rule-based features are incomplete. *Jan 95, p. 59*

★★★ **Saber LAN Workstation,** Saber Software, 214/361-8086, $199 plus $49 per node. LAN-management package is a useful tool for the price. *Aug 95, p. 73*

★★★★ **Skyline/Satellite,** AG Group, 510/937-7900, 1-station pack $795; 5-station pack $1195; 10-station pack $1995. Remote monitoring engines keep an eye on LAN traffic. *Sep 95, p. 74*

★★★ **SnapMail 2,** Casady & Greene, 408/484-9228, $250 (5 users); $420 (10 users); $1940 (50 users). E-mail software is easy to install, but its gateway interface is kludgy. *Dec 95, p. 75*

★★★★ **Snatcher 1.0,** Software Ventures, 510/644-3232, $49.95. Simple, efficient FTP tool connects to multiple sites simultaneously. *Aug 95, p. 81*

★★ **TurboTalk 1.0,** Information Presentation Technologies, 805/541-3000, $160 to $495. Network utility's performance is unimpressive on some network configurations. *Oct 95, p. 83*

DESKTOP PUBLISHING

★★★★ **Adobe PageMaker 6.0,** Adobe Systems, 206/622-5500, $895. Page-layout program's upgrade includes practical and powerful improvements. *Nov 95, p. 60*

★★★ **ColorDrive 1.0,** Pantone, 201/935-5500,

continues

Star Ratings

$199. Color-management software supports a broad range of color models. *Nov 95, p. 70*

★★★★ **FrameMaker 5.0,** Adobe Systems, 408/975-6000, $895. Page-layout program is a good choice for technical-document creation. *Nov 95, p. 63*

★ **HoTMetal Pro 2.0,** SoftQuad, 416/239-4801, $195. Web authoring software is hampered by a poorly designed interface. *Jan 96, p. 65*

★★★★ **Icefields 2.3,** The Color Partnership, 619/259-8688, $895. Professional printers will appreciate this stochastic-screening software. *Nov 95, p. 75*

★★★★ **QuarkXPress 3.2 (3.31),** Quark, 303/894-8888, $895 ($995 for Power Macintosh). A must-have layout tool for color publishers. *Nov 93, p. 51*

★★★★ **theTypeBook 4.0,** Rascal Software, 805/255-6823, $59.95. Customizable type-specimen generator is a worthwhile purchase. *Jun 95, p. 73*

EDUCATION/ENTERTAINMENT

★★★★ **3D Atlas 1.1,** EA World, 415/571-7171, $79.95. Well-designed atlas enriches map data with narration, photos, and movies. *May 95, p. 73*

★★★★★ **A.D.A.M. The Inside Story,** A.D.A.M. Software, 404/980-0888, $79.95. Stunning multimedia CD-ROM teaches basic anatomy and physiology. *Mar 95, p. 81*

★★★ **AmoebArena 1.0,** Casady & Greene, 408/484-9228, $49.95. Engaging strategy game pits amoeboid against amoeboid. *Jan 96, p. 75*

★★★ **CyberBoogie,** Times Mirror Multimedia, 314/531-2503, $49.95. Cute animation software is a good choice for very young kids. *Apr 95, p. 89*

★★★★ **The Daedalus Encounter,** Virgin Interactive Entertainment, 714/833-8710, $59.95. Escape from a doomed spacecraft in this interactive adventure. *Sep 95, p. 73*

★★★ **Digital Chisel 1.2,** Pierian Spring Software, 503/222-2044, $199.95, site license $995. Authoring tool creates good interactive quizzes but suffers from a nonstandard interface. *Jun 95, p. 71*

★★★ **French Assistant for Macintosh 1.0,** Globalink, 703/273-5600, $59.95. Translation software is easy to use and inexpensive, but slow. *Mar 95, p. 69*

★★★ **FrenchNow 3.0,** Transparent Language, 603/465-2230, $99 to $129. While it doesn't replace a class, software can help you learn French. *Dec 95, p. 83*

★★★★ **Full Throttle,** LucasArts, 415/472-3400, $49.95. Biker adventure game is witty and action-packed. *Jan 96, p. 73*

★★ **Haight-Ashbury in the Sixties,** Compton's NewMedia, 619/939-2500, $49.95. If you can remember the sixties, you probably don't need this CD-ROM. *Dec 95, p. 84*

★★★ **Kids World,** Bit Jugglers, 415/968-3908, $30. Screen-saver–creation tool for kids is clever, but its painting tools are lacking. *Mar 95, p. 83*

★★★ **King's Quest VII: The Princeless Bride,** Sierra Online, 206/649-9800, $59.95. Adventure game is entertaining, but adults might find its plot silly. *Jan 96, p. 75*

★★★ **The Legend of Kyrandia, Book 3,** Virgin Interactive Entertainment, 714/833-1999, $34.95. Enjoyable adventure game features good graphics and sound. *Jan 96, p. 77*

★★★★ **Links Pro CD,** Access Software, 801/359-2900, $69.95. An excellent simulation of golf's many challenges. *Jan 96, p. 73*

★★★★ **The Lost Mind of Dr. Brain,** Sierra On-Line, 206/649-9800, $44.95. Hilarious brainteasers are presented in an imaginative, arcade style. *Oct 95, p. 93*

★★★★ **Material World,** StarPress Multimedia, 415/274-8383, $59.95. Multimedia CD-ROM provides a fascinating look at diverse cultures. *Jun 95, p. 83*

★★★★ **Math Workshop,** Broderbund Software, 415/382-4700, $40. Youngsters can have some fun while learning math. *Aug 95, p. 89*

★★ **Merriam-Webster's Collegiate Dictionary on CD-ROM,** Merriam-Webster, 413/734-3134, $69.95. Powerful search capabilities don't make up for this dictionary's interface flaws. *Nov 95, p. 79*

★★★★ **Nile: Passage to Egypt,** Discovery Channel Multimedia, 301/986-1999, $49.95. Armchair adventurers will enjoy this multimedia journey on CD-ROM. *Oct 95, p. 93*

★★★ **Out of the Sun.** Domark software, 415/513-8929, $44.95. Flight-simulation game presents historic or custom battle scenarios. *Jan 96, p. 77*

★★★★★ **Passage to Vietnam,** Against All Odds Productions/Interval, 800/558-3388, dept. 100, $39.95 to $59.95. Stunning photojournalism CD-ROM sets a new standard for multimedia projects. *Dec 95, p. 83*

★★★ **Power Translator for Macintosh 2.0,** Globalink, 703/273-5600, $249. Translation software quickly produces results suitable for first drafts. *Mar 95, p. 69*

★★★ **Small Blue Planet 2.0 (2.0.1),** Now What? Software, 415/885-1689, $59.95. The satellite photos of this atlas are truly dazzling, although the interface is less than world class. *May 95, p. 73*

★★★★ **Storybook Weaver Deluxe 1.0,** MECC, 612/569-1500, $69.95. Well-designed program lets kids create their own storybooks. *May 95, p. 83*

★★★★ **Theorist 2.0,** Waterloo Maple Software, 519/747-2373, $299. Symbolic-math program is a great learning aid for students. *Jun 95, p. 79*

★★★★ **WarPlanes 1.0,** Maris Software, 800/336-0185, $69. Wonderful multimedia CD-ROM explores post-WWII military aviation. *Mar 95, p. 81*

★★★★ **Widget Workshop,** Maxis Software, 510/254-9700, $44.95. Clever mad scientist's laboratory encourages imagination and exploration. *Apr 95, p. 89*

FINANCE/ACCOUNTING

★★★★ **Managing Your Money 7.0,** MECA Software, 203/255-1441, $79.95. Personal financial software includes advanced investment features. *Oct 95, p. 81*

★★★★ **M.Y.O.B. 5.0,** BestWare, 201/586-2200, $139 ($239 with payroll). Well-designed interface makes double-entry accounting easy. *May 95, p. 63*

★★★ **QuickBooks 3.0,** Intuit, 415/322-0573, $119. Double-entry accounting program is easy to use but not entirely Mac-like. *Jun 95, p. 58*

★★★★/8.3 **Quicken Deluxe 6,** Intuit, 520/295-3220, $59.99. The best-selling package gets bigger and mostly better. *Feb 96, p. 65*

GRAPHICS

★★★ **AddDepth 2.0,** Ray Dream, 415/960-0768, $99. 3-D effects software provides a simple way to give depth to illustrations. *Nov 95, p. 81*

★★★★ **Adobe Dimensions 2.0,** Adobe Systems, 415/961-4400, $199. 3-D effects software has added color support plus drawing and text tools. *Apr 95, p. 71*

★★★★ **Adobe Photoshop 3.0 (3.0.4),** Adobe Systems, 415/961-4400, $895. Broader capabilities combine with simplified work environment. *Jan 95, p. 52*

★★★ **Adobe TextureMaker 1.0 (2.0),** Adobe Systems, 415/961-4400, $199. Texture generator creates backgrounds for multimedia or printed projects. *Oct 95, p. 89*

★★★ **Alien Skin Textureshop 1.0,** Virtus, 919/467-9700, $99. Apply random mutations to master textures to create custom patterns. *Jul 95, p. 81*

★★★ **Black Box 2.0,** Alien Skin Software, 919/832-4124, $119. Photoshop image filters are useful and worth their modest price. *Nov 95, p. 87*

★★★/6.9 **Boris Effects 1.01,** Artel Software, 617/566-0870, Premiere version $350; Media 100 version $695. Plug-in for Premiere and Media 100 adds video-effects control. *Feb 96, p. 85*

★★★ **Canvas 3.5 (3.5.2),** Deneba Software, 305/596-5644, $399. Lots of features but confusing interface. *Jan 94, p. 49*

★★★ **CD-Q 2.0,** Human Software Company, 408/741-5101, $145. Photoshop plug-in facilitates color corrections and separations on Photo CDs. *Jul 95, p. 65*

★/1.5 **Chagall 2.0.2,** Technosystems USA, 502/351-0108, $299. Image-editing application flunks test. *Feb 96, p. 78*

★★★★/8.0 **Claris Impact 2.0,** Claris, 408/987-7000, $99. Easy and affordable business-graphics software. *Feb 96, p. 66*

★★★★ **Color It 3.0,** MicroFrontier, 515/270-8109, $149.95. Venerable paint program has been updated with powerful new features. *Aug 95, p. 75*

★★★ **Colorize 2.0,** DS Design, 919/319-1770, $495. Colorizing software is effective, but expensive for a one-trick pony. *Dec 95, p. 81*

★★★★/7.3 **DrawTools 1.0,** Extensis, 503/274-2020, $149. Extensions add color, shape, and object tools to FreeHand and Illustrator. *Feb 96, p. 71*

★★ **FloorPlan Plus 1.1,** ComputerEasy International, 602/829-9614, $49.95. Affordable 2-D CAD program is intended for rudimentary design tasks. *Sep 95, p. 85*

★★★ **FullPixelSearch 1.5,** Avian Systems, 201/224-2025, $1295. Analyze scientific images with a variety of pixel-selection functions. *Jul 95, p. 79*

★★★ **Gryphon Batch It 1.0,** Gryphon Software, 619/536-8815, $199. Although it lacks conditional statements, batch processor is a time-saver. *Jun 95, p. 67*

★★★★ **Infini-D 3.0,** Specular International, 413/253-3100, $899. 3-D software does professional-quality rendering and animation. *Jan 96, p. 54*

★★★ **Intellihance 1.0,** DPA Software, 214/517-6876, $129 to $299. Photoshop plug-in automates the process of improving scanned graphics. *Sep 95, p. 71*

★★★★/8.3 **Kai's Power Tools 3.0,** MetaTools, 805/566-6200, $199. More-powerful plug-ins, more-baffling interface. *Feb 96, p. 57*

★★★★ **KPT Convolver 1.0,** MetaTools, 805/566-6200, $199. Imaginative and absorbing plug-in module creates Photoshop filters. *Aug 95, p. 71*

★★★★ **KPT Vector Effects 1.0,** MetaTools, 805/566-6200, $199. Helpful Illustrator and FreeHand filters have an inspired interface. *Oct 95, p. 72*

★★★★ **Live Picture 2.0,** HSC Software, 805/566-6200, $995. Latest version of this innovative image editor boasts many improvements. *Sep 95, p. 62*

★★★★ **MacDraft 4.0,** Innovative Data Design, 510/680-6818, $449. Excellent 2-D CAD program has

links to Excel and a clean interface. *Mar 95, p. 79*

★★★★ **MacPhase 2.0,** The Otter Solution, 315/768-3956, $279. Feature-rich program offers scientific and graphics image processing tools. *Aug 95, p. 85*

★★★★/8.1 **Macromedia FreeHand 5.5,** Macromedia, 415/252-2000, $595. Draw program outperforms competitor, for now. *Feb 96, p. 74*

★★★ **MovieFlo' 1.1,** The Valis Group, 415/435-5404, $899. Tug, twist, and pinch images with this special-effects program. *Jun 95, p. 60*

★★★★ **Paint Alchemy 2.0,** Xaos Tools, 415/487-7000, $199. Flexible image editor is an appealing add-on for digital artists. *Sep 95, p. 70*

★★★★ **PhotoEnhancer 1.0,** PictureWorks, 510/855-2001, $129. Nifty utility improves the quality of QuickTake photos. *Apr 95, p. 65*

★★★ **PhotoFix 2.8.8,** Microspot USA, 408/253-2000, $249. Image-editing/photo-enhancement program is a useful tool. *Sep 95, p. 81*

★★★ **PhotoFlash 2.0,** Apple Computer, 408/996-1010, $129. Image-editing utility provides basic image-retouching tools at a reasonable price. *Jul 95, p. 67*

★★ **PhotoFusion 2.0.3,** Ultimate, 818/993-8007, $695. Photoshop compositing plug-in is hampered by a poor interface. *Oct 95, p. 83*

★★★★ **PixelPaint Pro 3.01,** Pixel Resources, 404/449-4947, $379. Color paint program offers professional-level painting and image processing tools. *Mar 95, p. 55*

★★★ **PixelPutty Solo (1.5),** The Valis Group, 415/435-5404, $399. Affordable modeler lets you manipulate 3-D objects as if they were clay. *Jun 95, p. 77*

★★★★ **Poser 1.0,** Fractal Design, 408/668-5300, $199. 3-D illustration tool generates posable human figures. *Oct 95, p. 63*

★★★★ **PowerCADD 2.0,** Engineered Software, 910/299-4843, $795. CAD program features exceptional speed and an extensive array of tools. *Oct 95, p. 77*

★★★★/7.2 **QX-Tools 1.0,** Extensis, 503/274-2020, $149. Ten XTensions that make QuarkXPress more powerful. *Feb 96, p. 73*

★★★ **Ray Dream Designer 3.1.1,** Ray Dream, 415/960-0768, $349. 3-D graphics program provides competent modeling tools and excellent rendering. *Mar 95, p. 61*

★★ **Select 1.6,** Human Software , 408/741-5101, $245. CMYK color-correction plug-in duplicates many Photoshop functions. *Jul 95, p. 81*

★★★★ **SmartSketch 1.0,** FutureWave Software, 619/637-6190, $69.95. Innovative, easy-to-use graphics program unites painting and drawing. *Sep 95, p. 58*

★★★/5.0 **Tracer 1.0,** ScanVec, 508/694-9488, $795. Excellent but expensive autotracing. *Feb 96, p. 85*

★★★★ **Transverter Pro 3.0,** TechPool Studios, 216/382-1234, $395. Graphics-conversion tool deserves a place in every desktop publisher's toolbox. *Nov 95, p. 77*

★★★ **Virtus WalkThrough Pro 2.0,** Virtus, 919/467-9700, $495. Aside from occasional stumbles, this 3-D design tool is an exceptional program. *Apr 95, p. 59*

★★★★ **Vision 3d 4.0,** Strata, 801/628-5218, $695. 3-D modeling, rendering, and animation package offers excellent tools. *Jul 95, p. 56*

★★★ **Working Model,** Visual Basic, 415/574-7777, $2495. Motion-simulation system is a fine product, but a Power Mac version is needed. *Dec 95, p. 79*

★★ **xRes 1.11,** Fauve Software, 415/543-7178, $799. Image editor applies a variety of effects to selected areas of a large composition. *Jul 95, p. 60*

MATH/SCIENCE

★★★★ **The Fuzzy Logic Toolbox 1.0,** MathWorks, 508/653-1415, $895. Math-simulation aid incorporates fuzzy logic into models. *Sep 95, p. 89*

★★★★/7.5 **Igor Pro 2.0.4,** WaveMetrics, 503/620-3001, $495. Top-notch scientific graphing package. *Feb 96, p. 90*

★★★★ **LabView 3.1,** National Instruments, 512/794-0100, $1995. Instrumentation software can emulate most scientific and electronic test-bench instruments. *Nov 95, p. 62*

★★★★ **MLab,** Civilized Software, 301/652-4714, $1495. Mathematical-modeling software does fast computations on real-world problems. *Apr 95, p. 83*

★★★★/7.1 **SPSS 6.1,** SPSS, 312/329-2400, $695; modules $395 to $495. Mainframe statistics giant has new Mac interface. *Feb 96, p. 82*

★★★★ **Statistica/Mac 4.1,** StatSoft, 918/583-4149, $695. Statistical software is the undisputed features-per-dollar champion. *Mar 95, p. 79*

★★★★/8.3 **StatView 4.5,** Abacus Concepts, 510/540-1949, $595. Statistics and graphing package *Feb 96, p. 81*

ORGANIZATION/PRODUCTIVITY

★★★ **ACT 2.0,** Symantec Corp., 503/334-6054, $249.95. Contact manager has well-implemented contact fields but weak scheduling functions. *Mar 95, p. 77*

★★★★ **ClarisWorks 4.0,** Claris, 408/727-8227, $129. Integrated program's word processor and database are superb. *Oct 95, p. 62*

★★ **ClienTrac 2.0,** Whiskey Hill Software, 415/851-8702, $99. PIM is easy to use but slim on speed, features, and flexibility. *May 95, p. 75*

★★★ **Day-to-Day Organizer 1.0,** Portfolio Software, 802/434-6400, $149.95. Some components of this organizer are great, but others need work. *May 95, p. 61*

★★★ **Expresso 1.0,** Berkeley Systems, 510/540-5535, $69.99. Calendar program is attractive and easy to use but its address book is weak. *Apr 95, p. 73*

★★★ **FastTrack Schedule 3.0,** AEC Software, 703/450-1980, $299. Updated version of this project planner includes customizable features. *Aug 95, p. 79*

★★★★ **In Control for Workgroups 3.5,** Attain, 617/776-1110, $149.95; 10-pack $949.95. Flexible project planner/scheduler combines an outliner and a calendar. *Sep 95, p. 93*

★★★ **InfoGenie 1.0.5,** Casady & Greene, 408/484-9228, $79.95. Free-form data manager is appealing but lacks some of the competition's features. *Nov 95, p. 87*

★★★ **InTouch 2.5,** Prairie Group, 515/225-3720, $69.95. Free-form contact manager offers speedy access to information. *Sep 95, p. 69*

★★★ **Microsoft Works 4.0,** Microsoft, 206/882-8080, $99.95. Good word processing and drawing tools; poor spreadsheet and database modules. *Jan 95, p. 63*

★★★★ **Now Up-to-Date and Contact 3.5,** Now Software, 503/274-2800, $99. Calendar/address book combo features several enhancements. *Nov 95, p. 68*

★★ **Peanuts Family Organizer 1.0,** Individual Software, 510/734-6767, $19.95. Organizer's endearing interface doesn't make up for missing features. *Jun 95, p. 81*

PRESENTATION TOOLS

★★★★ **Authorware Professional 3.0,** Macromedia, 415/252-2000, $4995. Multimedia authoring program is feature-packed but costly. *Dec 95, p. 66*

★★★ **CyberSound FX 1.0,** InVision Interactive, 415/812-7380, $129. Plug-ins for Premiere make audio more polished, but access is cumbersome. *Nov 95, p. 91*

★★★ **Electronic Marker 1.0.2,** Consumer Technology Northwest, 503/643-1662, $34.95. Annotation tool can enhance demonstrations but needs better layer tools. *May 95, p. 71*

★★★ **HyperCard 2.3,** Apple Computer, 408/996-1010, $129. Authoring tool is an inexpensive solution for multimedia developers. *Nov 95, p. 66*

★★ **Living Album 2.5,** QuickMedia Labs, 408/749-9200, $129.95. Multimedia album is hampered by a crowded interface. *May 95, p. 81*

★ **MediaFactory 1.0,** Nuts Technologies, 408/980-7800, $199. Entry-level QuickTime movie editor has an awkward interface. *Nov 95, p. 89*

★★★★ **MediaPaint 1.0,** Strata, 801/628-5218, $695. QuickTime paint program lets multimedia developers edit ranges of frames. *Sep 95, p. 56*

★★★ **Microsoft PowerPoint 4.0,** Microsoft, 206/882-8080, $339. Presentation-graphics program is a good choice to use along with Word or Excel. *Feb 95, p. 67*

★★ **mPower 2.0,** Multimedia Design, 704/523-9493, $295. Multimedia authoring tool is too limited to be compelling. *Apr 95, p. 81*

★★★★ **Persuasion 3.0,** Adobe Systems, 206/622-5500, $495. Extensive charting options and hypertext options are key additions. *Sep 94, p. 65*

★★★★ **Presenter Professional 3.0,** VIDI, 818/358-3936, $1995. 3-D modeling/animation package is an excellent choice for multimedia producers. *May 95, p. 59*

★★ **Special Delivery 2.0,** Interactive Media, 415/948-0745, $399. Multimedia authoring tool isn't the best choice for complex projects. *Apr 95, p. 79*

★★★★ **TransJammer,** Elastic Reality, 608/273-6585, $99. Plug-in for Premiere and VideoShop offers 100 video-transition effects. *Aug 95, p. 83*

PROGRAMMING

★★★★ **AppWare 1.2,** Novell, 801/429-7000, $495. Development system features an easy-to-use graphical programming method. *Oct 95, p. 68*

★★★★ **FaceSpan 2.0,** Software Designs Unlimited, 214/578-6700, $199. AppleScript interface builder lets developers create sophisticated applications. *Nov 95, p. 64*

★★★★ **JAM 6,** JYACC, 212/267-7722, $2000. Development tools enable creation of large-scale corporate client-server databases. *Oct 95, p. 70*

★★★★/8.0 **LS FORTRAN 1.1,** Fortner Research, 703/478-0181, $695. FORTRAN rides again, running science programs on the Power Mac desktop. *Feb 96, p. 95*

★★★ **Script Debugger 1.0,** Late Night Software, 604/929-5578, $129. Script-development software improves on AppleScript, except in the debugging department. *Nov 95, p. 85*

★★★ **Symantec C++ 8.0,** Symantec, 503/334-6054, $499. Compiler has been improved and expanded but demands lots of resources. *Jul 95, p. 62*

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Star Ratings

★★★★/7.0 **Tools Plus 2.6,** Water's Edge Software, 416/219-5628, for Symantec's C/C++ and Pascal $149 each; for both $199; for CodeWarrior Bronze $199; for CodeWarrior Gold $249. Programmers' tool kit saves time. *Feb 96, p. 92*

UTILITIES

★★ **Adobe ScreenReady 1.0,** Adobe Systems, 415/961-4400, $199. PostScript image rasterizer can aid multimedia developers but has some flaws. *Dec 95, p. 71*

★★★ **Aladdin Desktop Tools 1.0,** Aladdin Systems, 408/761-6200, $89.95. Utilities collection is uneven but a worthwhile buy. *Aug 95, p. 69*

★★★ **Arcserve for Macintosh 1.5,** Cheyenne Software, 516/484-5110, $245 (5 users); $495 (20 users). A good backup program for mixed-platform networks. *Jan 96, p. 63*

★★★/6.2 **At Ease 3.0,** Claris, 408/727-8227, $46. This desktop alternative lets you share your Mac and worry less. *Feb 96, p. 81*

★★★★ **At Ease 3.0 for Workgroups,** Apple Computer, 408/996-1010, $295. Desktop alternative is a handy tool for network administrators. *Nov 95, p. 83*

★★★★ **BeyondPress 1.0,** Astrobyte LC, 303/534-6344, $595. QuarkXPress XTension is a great way to convert documents to Web pages. *Dec 95, p. 73*

★★★ **CanOpener 3.0,** Abbott Systems, 914/747-4171, $125. Utility opens many types of files but falls short in file-search department. *May 95, p. 67*

★★★★ **CD Directory 1.0,** Insignia Solutions, 415/694-7600, $69.95. Utility stores catalogs of CD directories on a hard drive. *Jul 95, p. 73*

★★★ **Color Compass 1.0,** Praxisoft, 703/729-3391, $129. Speedy, specialized tools blend, match, and tweak colors. *Aug 95, p. 77*

★★★★★ **Conflict Catcher 3,** Casady & Greene, 408/484-9228, $99.95. Extension-management utility offers a friendly, flexible approach to conflict resolution. *Sep 95, p. 69*

★★★★ **Disc-To-Disk,** Optical Media International, 408/376-3511, $199. Audio-capture utility is a useful tool for multimedia authors. *Jun 95, p. 69*

★★★★ **DiskGuard 1.0.1 and DiskGuard Remote,** ASD Software, 909/624-2594, $129 to $799. Rock-solid, flexible disk-protection tools are worth serious consideration. *Mar 95, p. 75*

★★★ **DragStrip 1.0,** Natural Intelligence, 617/876-4876, $39.95. Icon-based file and folder organizer brings order to cluttered desktops. *May 95, p. 79*

★★★ **File Genie Pro 1.1,** Duet Development, 408/559-3838, $89. Disk- and file-management utility is fast but has limited search and sort criteria. *Oct 95, p. 87*

★★★★ **FolderBolt Pro 1.0.3,** Kent Marsh, 713/522-5625, $129.95. Top-notch encryption schemes secure your Mac's contents. *Jul 95, p. 77*

★★★ **Gear 2.5,** Elektroson, 610/617-0850, $799. CD-recordable mastering software is a mixed bag. *Sep 95, p. 91*

★★★★ **Graffiti 1.01,** Palm Computing, 415/949-9560, $79. Teach yourself a new writing system that Newton can handle. *May 95, p. 77*

★★★ **Here & Now 1.0,** Software Architects, 206/487-0122, $89.95. File-transfer utility facilitates putting a Mac disk in a PC. *Nov 95, p. 81*

★★★★ **InstantReplay 1.0,** Strata, 801/628-5218, $149. Utility records on-screen activity and saves it as a QuickTime movie. *Sep 95, p. 89*

★★★ **MacTools Pro 4.0,** Symantec, 503/690-8090, $149.95. This utility does a good job of diagnosing and fixing disk problems, but suffers from large RAM requirements and expensive tech support. *May 95, p. 73*

★★★ **Menu Master Mac,** Electronic Learning Systems, 904/375-0558, $99; 15-site license $299. Security software is useful but could use some additional features. *Sep 95, p. 95*

★★★★ **MultiClip Pro 3.1,** Olduvai, 305/670-1112, $59. Utility is what Apple's Clipboard and Scrapbook should have been. *Apr 95, p. 67*

★★★ **Multimedia Utilities 1.1,** Motion Tool Works, 415/541-9333, $99.95. Six appealing utilities address QuickTime moviemaking but you should remember to save often. *Jul 95, p. 71*

★★★ **Norton Utilities for Macintosh 3.1,** Symantec, 503/334-6054, $149.95. Utilities suite features strong disk repair and data recovery but weak backup. *Feb 95, p. 63*

★★★★ **Now Utilities 5.0,** Now Software, 503/274-2800, $89. Well-integrated collection of utilities. *Jan 95, p. 65*

★★★ **On Cue II Utilities 3.0,** ComputerEasy International, 602/829-9614, $99.95. Eight utilities add functionality to the Mac Operating System. *Sep 95, p. 93*

★★★★ **OptiMem RAM Charger 2.0.1,** Jump Development Group, 412/681-2692, $129. Use RAM more efficiently with this memory-management utility. *Jul 95, p. 75*

★★★ **PaperPower 1.0,** Piptel, 513/294-6656, $149. Graphics-tablet utility is useful for macros, but its overlays can be tricky. *Apr 95, p. 87*

★★★★ **Power Secretary Power Edition 2.0,** Articulate Systems, 617/935-5656, $2495. Speech-recognition program learns your voice patterns as you use it. *Sep 95, p. 60*

★★★★ **QuicKeys 3.0,** CE Software, 515/221-1801, $139. Easy-to-use shortcut manager. *Mar 94, p. 61*

★★★★ **RAM Doubler 1.0.1 (1.5),** Connectix, 415/571-5100, $99. Inexpensive system extension really does double your RAM. *May 94, p. 63*

★★★ **RapidCD 1.04,** Insignia Solutions, 415/694-7600, $69.95. Utility provides speedy access to frequently used data on CD-ROM. *Jul 95, p. 73*

★★★ **RescueTxt 1.0,** Abbott Systems, 914/747-3116, $79. Text-retrieval utility works well but doesn't tell you the source file's name. *Apr 95, p. 83*

★★★★ **S/Link 2.0,** Synclavier, 603/448-8887, $249. Utility is a valuable aid for anyone who does audio file conversion. *Nov 95, p. 91*

★★★★/8.4 **SCSI Director Pro 4.0,** Transoft, 805/897-3350, $99.95. Hard disk formatting and testing utility. *Feb 96, p. 86*

★★★★/8.9 **Speed Doubler 1.0.2,** Connectix, 415/571-5100, $99. Connectix makes a Power Mac's 680X0 emulation feel native. *Feb 96, p. 56*

★★★★ **StuffIt Deluxe 3.5,** Aladdin Systems, 408/761-6200, $129.95. If you're looking for a compression solution, this is it. *Mar 95, p. 69*

★★★★ **TypeTamer 1.0.4,** Impossible Software, 714/470-4800, $59.95. Versatile font utility provides information on installed fonts and simplifies tasks such as typing special characters and reselecting fonts from the menu. *May 95, p. 77*

★★★ **ultraSecure 3.524,** usrEZ Software, 714/756-5140, $239. Security program offers a comprehensive set of protection tools. *Sep 95, p. 81*

★★★★ **Virex 5.5.1,** Datawatch, 508/988-9700, $99.95. Comprehensive, reliable, and speedy virus-detection utility helps protect files. *May 95, p. 65*

★★★ **Zonkers 1.0,** Nova Development, 818/591-9600, $19.95. Redecorate your Mac with a collection of silly desktop enhancements. *Aug 95, p. 89*

VERTICAL MARKETS

★★★ **ConcertWare 1.5.7,** Jump Software, 415/917-7460, $159. Music-notation program is affordable and easy to use, but lacks features. *Jun 95, p. 75*

★★★ **DigiTrax 1.1,** Alaska Software, 408/738-3320, $349. Audio-recording software lacks some features but is easy to use. *Mar 95, p. 63*

★★★★ **FreeStyle 1.01,** Mark of the Unicorn, 617/576-2760, $200. Music sequencer with notation is a good choice for beginners. *Nov 95, p. 70*

★★★ **Insta Software,** Chang Labs, 408/727-8096, $29 per module. No-frills relational databases handle forms and record-keeping for businesses. *Aug 95, p. 77*

★★★★ **Nightingale 2.0,** TAP Music Systems, 206/462-1007, $495. Music-notation software is fast, feature-laden, and easy to learn. *Oct 95, p. 81*

★★★★ **Overture 1.02,** Opcode Systems, 415/856-3333, $495. Easy-to-learn music-notation software has a friendly interface. *Apr 95, p. 75*

★★★ **Performer 5.02,** Mark of the Unicorn, 617/576-2760, $495. MIDI recording program has been overhauled but is still hard to set up. *Mar 95, p. 65*

★★★/6.9 **Quicken Family Lawyer 6.0b,** Parsons Technology, 319/395-9626, $49. Helps you prepare 61 legal documents. *Feb 96, p. 88*

★★★ **Route 66 1.5,** Route 66 Geographic Information Systems B.V., 415/957-0666, $79.95. Route planner is fast but omits some cities. *May 95, p. 65*

★★★ **StoryBoard Artist 1.5,** PowerProduction Software, 310/937-4411, $499. Storyboard-creation software is useful but expensive. *Oct 95, p. 91*

★★★ **Vision 2.08,** Opcode Systems, 415/856-3333, $495. MIDI program's exclusive features give it a usability edge. *Mar 95, p. 65*

★★ **Visual Arranger 1.0,** Yamaha Corp. of America, 714/522-9240, $59.95. Song-building software is innovative, but replacing notation with icons doesn't work. *Nov 95, p. 89*

WRITING TOOLS

★★★★ **Bookends Pro 3.1,** Westing Software, 415/435-9343, $129. Comprehensive database program catalogs and stores reference material. *Mar 95, p. 73*

★★★★ **EndNote Plus 2.0,** Niles & Associates, 510/649-8176, $299. Indispensable bibliography and citation manager is easy to learn and use. *Apr 95, p. 77*

★★★ **FullWrite 2.01,** Akimbo Systems, 617/776-5500, $395. Although its modular architecture is complex, this word processor is worth considering. *Apr 95, p. 69*

★★★ **Inspiration 4.1,** Inspiration Software, 503/245-9011, $195. Writing tool shows the relationships between ideas. *Apr 95, p. 75*

★★★ **Microsoft Word 6.0 (6.0.1),** Microsoft, 206/882-8080, $339. Word processor's many new features may benefit users with fast Macs. *Feb 95, p. 53*

★★★ **Nisus Writer 4.0,** Nisus Software, 619/481-1477, $495. Word processor excels in specialized areas but has flawed table editor. *Mar 95, p. 53*

★★ **Read-It O.C.R. Pro 5.0,** Olduvai, 305/670-1112, $395. OCR software has nice features but its recognition engine isn't up to par. *Apr 95, p. 79*

★★★ **Three by Five 2.0,** MacToolkit, 310/395-4242,

$99. Idea organizer uses the metaphor of index cards on a corkboard. *Aug 95, p. 87*

★★★/6.7 **WordPerfect 3.5,** Novell Business Applications, 801/225-5000, $189. Popular word processor adds HTML editor. *Feb 96, p. 61*

hardware

INPUT DEVICES

★★★★ **ArtPad,** Wacom Technology, 360/750-8882, $199. Pressure-sensitive tablet is sheer convenience. *Apr 95, p. 67*

★★★★ **ArtZ II,** Wacom Technology, 360/750-8882, $389.99. Graphics tablet has unique stylus that erases as well as draws. *Dec 95, p. 79*

★★★ **ChoiceStick 1.0.2,** Kernel Productions, 302/456-3026, $69.95. Port lets you attach a pair of joysticks to a Mac. *Sep 95, p. 85*

★★★/6.0 **Desktop GlidePoint,** Alps Electric, 408/432-6000, $99.95. New input device offers adjustable base and cursor-release delay. *Feb 96, p. 68*

★★★★ **DrawingSlate II,** CalComp, 602/948-6540, $395. Responsive digitizing tablet is an excellent choice for artists and illustrators. *Jun 95, p. 83*

★★★ **GlidePoint,** Alps Electric, 408/432-6000, $99. Alternative pointing device lets you position the cursor by moving your finger. *Jul 95, p. 77*

★★ **Jetstick,** CH Products, 619/598-2518, $74.95. Joystick's hardware is fine, but its manual and software are inadequate. *Sep 95, p. 95*

★★★ **MacAlly,** The Mace Group, 213/780-6110, $49. ADB mouse doesn't stand out from the crowd, but is durable and affordable. *Jul 95, p. 75*

★★★ **Mouse Deluxe Mac,** MicroSpeed, 510/490-1403, $69. Mouse offers extra buttons, but its shape might not suit everyone. *Mar 95, p. 83*

★★★ **Mouse-Trak,** Itac Systems, 214/494-3073, $179. Input device is sturdy, but buttons can be hard to reach. *Nov 95, p. 83*

★★★★★ **PaperPort (Vx),** Visioneer, 415/812-6400, $399. Versatile scanner makes it easy to capture, organize, and retrieve documents. *May 95, p. 60*

★★ **Point Pad,** Hagiwara Sys-Com, 619/546-9989, $99. Pointing device is compact but can be awkward to use. *Oct 95, p. 87*

★★★★/7.0 **QuePoint II,** MicroQue, 801/263-1883, $79.95. Despite the drawbacks of a touchpad, the QuePoint's excellent software makes it a clear winner. *Feb 96, p. 68*

★★★ **Remote Point,** InterLink Electronics, 805/484-1331, $199. Cordless pointing device is handy, but controlling objects onscreen can be hard. *Apr 95, p. 85*

★★★★ **Thinking Mouse Macintosh ADB,** Kensington Microware, 415/572-2700, $139.95. Mouse has 4 programmable buttons that can automate tasks. *May 95, p. 83*

★★/4.3 **TouchPad,** Touché Technologies, 612/830-1414, $59.95. The TouchPad matches the PowerBook's dark case. *Feb 96, p. 68*

★★★ **Trackball Pro ADB,** CH Products, 619/598-2518, $119.95. Inexpensive trackball falls short in programmability and overall functionality. *Sep 95, p. 91*

MISCELLANEOUS HARDWARE

★★★ **Apple PCMCIA Expansion Module,** Apple Computer, 408/996-1010, $219. PowerBook expansion module is well designed but expensive. *Mar 95, p. 57*

★★★★ **Colortron,** Light Source Computer Images, 415/925-4200, $1195. Hand-held spectrophotometer helps match on-screen and printed colors. *Jun 95, p. 56*

★★★★ **DayStar PowerPro 601/DayStar Turbo 601,** DayStar Digital, 404/967-2077, PowerPro 601 $1599; Turbo 601 $1499. Impressive 601-based accelerator cards squeeze more performance out of Macs. *Sep 95, p. 67*

★ **EAB401P Speakers,** Panasonic Communications & Systems, 800/742-8086, $99. Small, inexpensive speakers provide less-than-state-of-the-art performance. *Apr 95, p. 58*

★★ **EAB701P Speakers,** Panasonic Communications & Systems, 800/742-8086, $249. These speakers sound thin and slightly harsh. *Apr 95, p. 58*

★★ **LabTec LCS-3210,** Labtec, 360/896-2000, $169.99. Speakers have a harsh midrange and poorly implemented 3-D sound. *Dec 95, p. 84*

★★★★ **MMS557,** Audio-Technica USA, 216/686-2600, $149.95. These speakers look good and sound good. *Apr 95, p. 87*

★★ **NEC AudioTower,** NEC Technologies, 708/860-9500, $99. Speaker system's sound quality is nothing to shout about. *May 95, p. 81*

★★★★ **Reno Portable CD-ROM Player,** MediaVision, 510/770-8600, $349. Portable CD-ROM player is lightweight, versatile, and easy to set up. *Jun 95, p. 65*

★★ **Smart Label Printer EZ30,** Seiko Instruments USA, 408/922-5800, $199. Label printer's print quality and speed are disappointing. *Nov 95, p. 72*

★★★ **SoftBoard Model 205,** Microfield Graphics, 503/626-9393, $2795. Electronic whiteboard is expensive but does the job. *Jan 96, p. 71*

★★★ **Vivid 3D Pro,** NuReality, 714/442-1080, $149.95. Sound-enhancement system produces 3-D sound from a pair of speakers. *Aug 95, p. 87*

★★★★ **YST-SS1010,** Yamaha Corp. of America, 714/522-9240, $349.95. Satellite-and-subwoofer speaker system is highly recommended. *Jul 95, p. 79*

MODEMS/NETWORK HARDWARE

★★★ **GeoPort Telecom Adapter Kit,** Apple Computer, 408/996-1010, $129.95. Adapter unlocks the capabilities of Apple's GeoPort modem. *Oct 95, p. 75*

★★★ **Internet Server Solution for WWW,** Apple Computer, 408/996-1010, $2909. Web server is ideally suited for small-business sites. *Oct 95, p. 65*

★★ **Manta 500EN; Starfish Ethernet Access Point,** Digital Ocean, 913/888-3380, Manta $799; Starfish $1850. Wireless-communications package is capable but much too expensive. *Dec 95, p. 77*

★★★★ **OneWorld Combo,** Global Village Communication, 408/523-1000, $1499 without modems; $2099 with modems. Server is the very model of a multiuser modem pool. *Sep 95, p. 78*

★★★★ **OneWorld Internet 1.0, 700 Series,** Global Village Communication, 408/523-1000, $1699 plusmonthly fee. Internet gateway offers E-mail and Internet access in an approachable format. *Jun 95, p. 63*

★★★ **Power Class 28.8 Data/Fax Modem,** Motorola, 205/430-8000, $395. Fax modem's hardware is superb, but it's hampered by mediocre software. *Oct 95, p. 89*

★★★★ **TelePort Platinum,** Global Village Communication, 408/523-1000, $279. Reliable fax modem includes call recognition and an answering machine. *Aug 95, p. 81*

PRINTERS

★★★★ **Apple Color StyleWriter 2200,** Apple Computer, 408/996-1010, $419. Portable ink-jet printer is ideal for color output when you're on the road. *Nov 95, p. 66*

★★★★ **Apple Color StyleWriter 2400,** Apple Computer, 408/996-1010, $525. Economical color ink-jet printer offers gorgeous output. *Apr 95, p. 63*

★★★★ **Fargo FotoFun,** Fargo Electronics, 612/941-9470, $399.95. Dye-sublimation printer produces good output at a reasonable price. *Jan 96, p. 61*

★★★/5.4 **HP CopyJet M,** Hewlett-Packard, 800/752-0900, $3649. Color copier and ink-jet printer in a single unit. *Feb 96, p. 77*

★★★★ **HP LaserJet 5MP,** Hewlett-Packard, 800/752-0900, $1299. Laser printer meets the high demands of small businesses and home offices. *Jul 95, p. 58*

★★★★ **LaserWriter 4/600 PS,** Apple Computer, 408/996-1010, $929. Compact printer produces great-looking 600-dpi output. *Dec 95, p. 60*

★★★★ **LaserWriter 16/600 PS,** Apple Computer, 408/996-1010, $2399. If speed is what you need, this reasonably priced printer is it. *Mar 95, p. 52*

★★ **Nikon Coolprint,** Nikon Electronic Imaging, 516/547-4355, $2350. Color dye-sublimation printer is fast, but print quality is flawed. *Sep 95, p. 83*

★★★ **Phaser 140,** Tektronix, 503/627-7111, $1695. Ink-jet is a capable color printer for a small workgroup. *Apr 95, p. 63*

★★★ **Pictura 310,** Fargo Electronics, 612/941-9470, $4995; optional Adobe Level 2 PostScript package $795. Printer produces acceptable print quality, but its color-matching capabilities are substandard. *Jul 95, p. 61*

★★★★ **StyleWriter 1200,** Apple Computer, 408/996-1010, $269. Newest model of Apple's ink-jet printer offers improved print quality. *Sep 95, p. 65*

★★★★ **Stylus Color,** Epson America, 310/782-0770, $699. Color ink-jet's print quality is superb and its price is reasonable. *May 95, p. 58*

★★★ **Typhoon 8,** Dataproducts, 818/887-8000, $3100 (600 dpi, 4MB of RAM); $5199 (1200 dpi, 36MB of RAM). Workgroup printer offers top-notch 1200-dpi output but is a bit pricey. *Dec 95, p. 64*

★★ **Xerox 4510ps,** Xerox, 800/349-3769, $1745. Printer has neither the performance nor the quality to justify its price. *Dec 95, p. 68*

SCANNERS

★ **Digital Fotovix IIIS-D,** Tamron Industries, 516/484-8880. $2299. Video slide scanner's image quality doesn't measure up to the competition. *Jan 96, p. 67*

★★★ **Fujitsu ScanPartner Jr.,** Fujitsu Computer Products of America, 408/432-6333, $499. Compact scanner with good OCR software is an economical scanning solution. *Jul 95, p. 63*

★★★★ **HP ScanJet 3c,** Hewlett-Packard, 208/323-2551, $1179. Economical scanner offers a broad tonal range and accurate colors. *Oct 95, p. 79*

★★ **Pro Imager 4000,** PixelCraft, 510/562-2480, $2995. Scanner delivers excellent highlight detail but produces noise in shadow areas. *Jun 95, p. 59*

★★★★ **Pro Imager 8000,** PixelCraft, 510/562-2480, $12,995. Demanding prepress users will like this scanner. *Jun 95, p. 59*

★★★ **Reli 4830T,** Relisys, 408/945-9000, $1699. If you can live with slow performance, this scanner is a bargain. *Jun 95, p. 71*

continues

Star Ratings

★★★★ **SprintScan 35,** Polaroid, 617/386-2000, $2495. Compact, efficient, cost-effective scanner transfers slides or negatives to a Mac. *Jun 95, p. 79*

★★★ **Vista-S8,** Umax Technologies, 510/651-8883, $995 (LE+); $1095 (Pro+). 24-bit color flatbed scanner has a lot of useful features for its low price. *Jul 95, p. 67*

SYSTEMS/STORAGE

★★★★/6.9 **81/110,** Radius, 408/541-6100, $3000. A relabeled Power Mac 8100, this NuBus system offers a lower price than a PCI Mac. *Feb 96, p. 96* **Editors' Choice** for best science-and-engineering Mac.

★★★★ **Brainstorm Accelerator for the Macintosh SE,** Brainstorm Products, 415/988-2900, $199. If your budget won't buy a new Mac, consider this accelerator. *Mar 95, p. 67*

★★★ **Envoy Wireless Communicator,** Motorola, 800/894-7353, $1000 to $1500. Magic Cap–based PDA was our reviewers' first choice for E-mail. *Aug 95, p. 62*

★★★★ **EZ135,** SyQuest Technology, 510/226-4000, $249. Removable drive is fast and comes with a fine selection of bundled software. *Dec 95, p. 58*

★★★ **Marco Wireless Communicator,** Motorola, 800/894-7353, $900 to $1400. Newton OS–based PDA includes a radio modem. *Aug 95, p. 62*

★★★ **Master CD Pro,** MicroNet Technology, 714/453-6000, $4995. Recordable CD-ROM drive is a good tool for professional CD production. *Aug 95, p. 83*

★★★ **MessagePad 120,** Apple Computer, 408/996-1010, $599; 2MB model $699. Apple's PDA is a good choice for specialized tasks. *Aug 95, p. 62*

★★★/5.6 **Performa 5125CD,** Apple Computer, 408/996-1010, $2300. The all-in-one design is appealing, but the performance is just so-so. *Feb 96, p. 96*

★★★★/7.1 **Power 100,** Power Computing, 512/258-1350, $1699. Powerful and inexpensive, the Power 100 comes bundled with all the extras you'd want. *Feb 96, p. 96* **Editors' Choice** for best home and small office Mac.

★★★★/7.4 **Power 120,** Power Computing, 512/258-1350, $1999. Like its Power 100 sibling, this system offers strong performance at a good price. *Feb 96, p. 96*

★★★/5.8 **PowerBook 5300,** Apple Computer, 408/996-1010, $2300. A gray-scale screen and middling performance make this just an acceptable notebook. *Feb 96, p. 96*

★★★/5.9 **PowerBook 5300c,** Apple Computer, 408/996-1010, $4500. A great color screen and strong expandability balance with so-so performance. *Feb 96, p. 58* **Editors' Choice** for best portable Mac. *Feb 96, p. 96*

★★★/5.9 **PowerBook 5300cs,** Apple Computer, 408/996-1010, $3600. Good expansion, so-so speed, and a decent color screen make this fine for short-term use. *Feb 96, p. 96*

★★★/6.5 **Power Macintosh 7200/75,** Apple Computer, 408/996-1010, $1600 . A dumbed-down version of the 7500, this system offers just the basics. *Feb 96, p. 96*

★★★★/7.8 **Power Macintosh 7500/100,** Apple Computer, 408/996-1010, $3100. Powerful and relatively inexpensive, the Power Mac 7500/100 shines in its easy-to-upgrade design. *Feb 96, p. 96* **Editors' Choice** for best business-and-professional Mac.

★★★ **Power Macintosh 8100/110,** Apple Computer, 408/996-1010, $6379. Power Mac offers increased speed and improved NuBus circuitry. *Mar 95, p. 50*

★★★★/7.7 **Power Macintosh 8500/120,** Apple Computer, 408/996-1010, $4200. The 8500's 604 CPU and bundled cache give it good performance. *Feb 96, p. 96* **Editors' Choice** for best publishing-and-graphics Mac and best media-authoring Mac.

★★★ **Power Macintosh 9500/132,** Apple Computer, 408/996-1010, $5799. Power Mac offers speed, expansion, and lots of memory. *Oct 95, p. 60*

★★★★/7.6 **PowerWave 604/120,** Power Computing, 512/258-1350, $3199. Power Computing has made the 604 CPU available at 601-based systems' prices. *Feb 96, p. 54* **Editors' Choice** for best business-and-professional Mac. *Feb 96, p. 96*

★★★★/7.6 **PowerWave 604/132,** Power Computing, 512/258-1350, $3699 (256K cache card included). This fast, sensibly priced system bundled with bonus software is a great value. *Feb 96, p. 54*

★★★★/7.7 **PowerWave 604/150,** Power Computing, 512/258-1350, $4499 (512K cache card included). The fastest Mac currently available, the price is not quite as attractive as for other PowerWave models. *Feb 96, p. 54*

★★ **RCD-1000,** Pinnacle Micro, 714/727-3300, $1695. CD-Recordable drive is easy to use but too unreliable for day-to-day backup. *Jun 95, p. 81*

★★★/5.1 **SCSI PowerPlug II,** Hot Wire Technology, 203/761-0651, $119.99. A fast way to swap SCSI devices. *Feb 96, p. 86*

★★★ **SledgeHammer8000FT,** FWB, 415/325-4392, $23,599. Level 5 RAID array provides constant access to your stored information. *Sep 95, p. 59*

★★★ **Sony Magic Link,** Sony, 800/571-7669, $699.95. Using this PDA is a breeze, but it lacks applications. *Aug 95, p. 62*

★★★/5.8 **System 100,** Radius, 408/541-6100, $10,500. Radius bundles its mediocre digital-video cards on a relabeled Power Mac 8100—that's no wise investment. *Feb 96, p. 96*

★★★★ **Zip Drive,** Iomega, 801/778-1000, $199.95; 100MB cartridge $19.95. External drive combines speedy performance, convenience, and economy. *Jul 95, p. 59*

VIDEO/DISPLAY

★★/4.2 **AlphaScan GLX,** Sampo Technology, 770/449-6220, $1495. Low price fails to outweigh poor image quality. *Feb 96, p. 165*

★★★/5.5 **Diamond Pro 21TX,** Mitsubishi Electronics America, 714/220-2500, $2199. Washed-out colors hold back an otherwise strong contender. *Feb 96, p. 165*

★★★ **EAsycolor 24/1360,** EA Research, 510/867-0967, $1699. Video board offers Photoshop CMYK acceleration and multisync monitor support. *Aug 95, p. 64*

★★★ **Encoder Pro,** P2 Systems, 206/525-2081, $259. Inexpensive Mac-to-TV adapter is a good value. *Jan 96, p. 69*

★★/4.4 **FlexScan F2 21,** Nanao, 310/325-5202, $2299. Blurry, dim image and too high a price. *Feb 96, p. 165*

★★★ **Kodak Digital Camera 40,** Eastman Kodak, 716/726-7260, $995. Digital camera can use 37mm lens but has some flaws. *Jan 96, p. 59*

★★/4.8 **Multigraph 445X,** Nokia Display Products, 415/943-4071, $2775. Adequate image quality, but at too high a price. *Feb 96, p. 165*

★★★/6.2 **Multiple Scan 20 Display,** Apple Computer, 408/996-1010, $2149. Not as vibrant as it could be, but a good value. *Feb 96, p. 165*

★★★/5.9 **MultiscanTC,** Sony, 408/432-0190, $3950. Special color-adjustment tools don't overcome mediocre performance. *Feb 96, p. 165*

★★★★/7.3 **MultiSync XE21,** NEC Technologies, 508/264-8000, $1899. Rich, bright images complemented by excellent controls. *Feb 96, p. 165*

★★★/5.8 **MultiView 21,** Radius, 408/541-5700, $2149. Seductively rich colors, but too soft a focus. *Feb 96, p. 165*

★★★ **PaintBoard Prism GT,** RasterOps, 408/562-4200, $999. Video board offers good QuickDraw acceleration but no Photoshop acceleration. *Aug 95, p. 64*

★★★/5.0 **PanaSync/Pro C2192P,** Panasonic Communications & Systems, 201/348-7000, $1999. Reasonable price fails to overcome weak image quality. *Feb 96, p. 165*

★★★★ **Panelight ZX,** Panelight Display Systems, 415/772-5800, $3995 to $4695. LCD panel offers vivid images at a relatively low price. *Mar 95, p. 77*

★★★★ **Presenter TView,** TView, 503/643-1662, $449. Reliable Mac-to-TV adapter produces an excellent picture. *Jan 96, p. 69*

★★★★/8.6 **PressView 21 SR,** Radius, 408/541-6100, $3999. The best professional-quality display gets better. *Feb 96, p. 62*

★★★ **QA-1500,** Sharp Electronics, 201/529-8731, $5795. LCD panel's display is crisp, but placing a presentation on its PC Card is cumbersome. *May 95, p. 69*

★★★★ **QuickCam,** Connectix, 415/571-5100, $149.95. Tiny, fun, easy-to-use digital camera captures video. *Mar 95, p. 73*

★★★ **QuickTake 150,** Apple Computer, 408/996-1010, $739. Digital camera is easy to use and includes close-up lens. *Jan 96, p. 59*

★★ **Radius Telecast,** Radius, 408/541-6100, $9995. QuickTime-based video editor has potential, but software is not yet mature. *Jan 96, p. 65*

★★★★/7.3 **RasterOps SuperScan Mc 21,** NSA/Hitachi, 617/461-8300, $2299. Top performance plus sensible, intuitive controls create a winning combination. *Feb 96, p. 165* **Editors' Choice** for best two-page monitor.

★★★★ **SpigotPower AV,** Radius, 408/541-6100, $999. Make full-screen movies with this first-rate video-compression board. *Jun 95, p. 67*

★★/4.1 **SyncMaster 20GLs,** Samsung Electronics America, 201/691-6200, $1599. Glare-catching, image-distorting tube and weak controls. *Feb 96, p. 165*

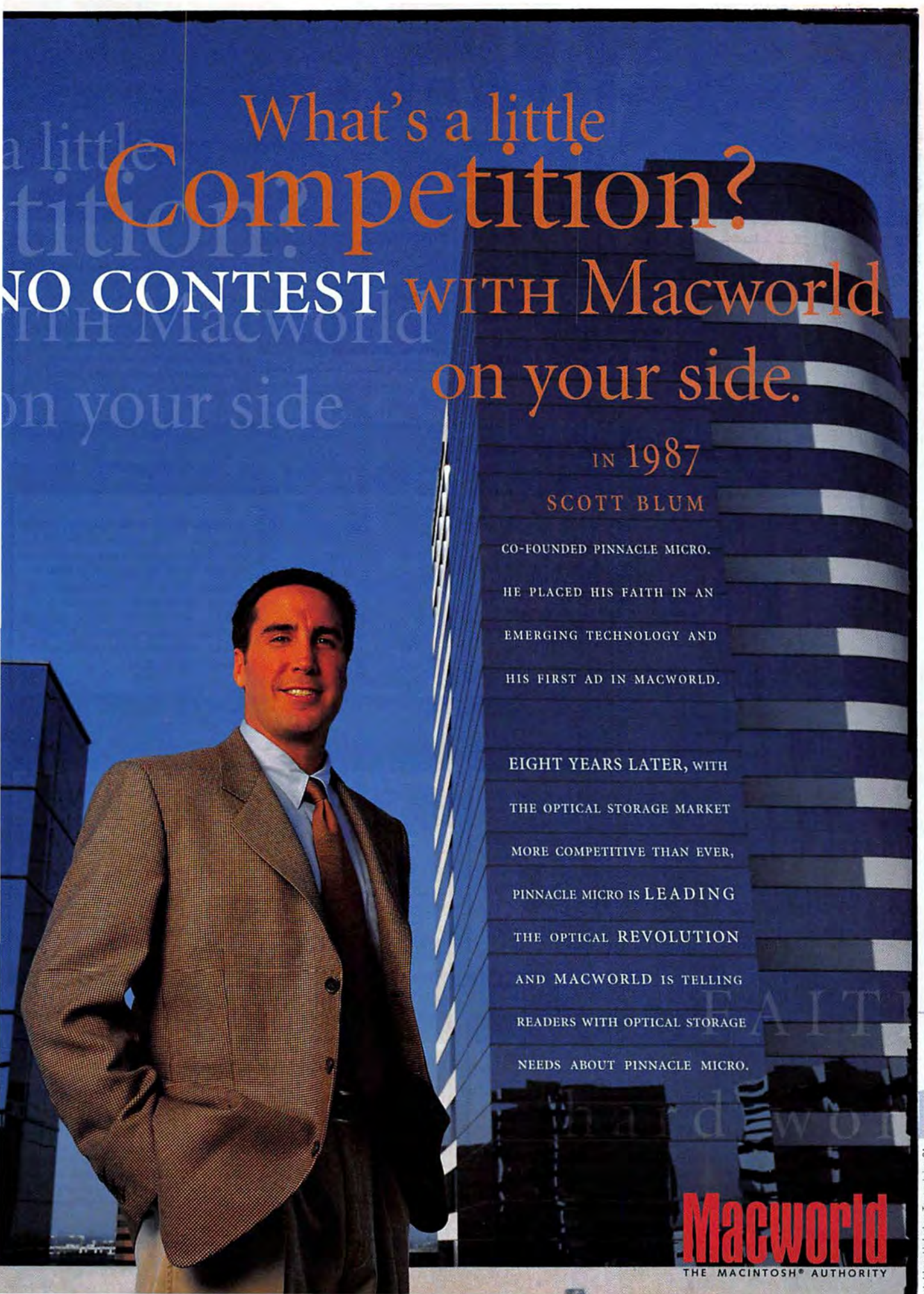
★★★★ **Targa 2000 1.2,** Truevision, 408/562-4200, $5495. Video board offers good picture quality and fully synced 16-bit audio. *Dec 95, p. 71*

★★★★ **Thunder IV GX 1360,** Radius, 408/541-6100, $2999. Video board provides impressive QuickDraw and Photoshop acceleration. *Aug 95, p. 64*

★★★ **VideoDirector 1.5,** Gold Disk, 408/782-0200, $199.95. Low-end video-editing system logs, edits, and organizes videotape footage. *Jun 95, p. 75*

★★★/5.8 **ViewSonic 21PS,** ViewSonic, 909/869-7976, $2095. Bright, vibrant, though not particularly sharp image. *Feb 96, p. 165*

★★★/5.3 **VisionMaster Pro 21,** Iiyama North America, 215/957-6543, $1995. Good image quality, but confusing controls. *Feb 96, p. 165* m


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- ☐ 1. Apple Workgroup Servers, Mac Quadra series, Centris series, II-series, Power Mac series
- ☐ 2. Mac Classic series, LC-series
- ☐ 3. Mac Performa series
- ☐ 4. Mac PowerBook series, Duo series
- ☐ 5. Other Macs (SE, SE/30, Plus, 512K, etc.)
- ☐ 6. None above

Do you recommend, buy, specify or approve microcomputer software and/or peripherals?

☐ Yes ☐ No

If yes, please indicate for how many Macintosh personal computers you have this involvement

- ☐ 1. 1-3
- ☐ 2. 4-9
- ☐ 3. 10-19
- ☐ 4. 20-49
- ☐ 5. 50-99
- ☐ 6. 100-499
- ☐ 7. 500+

Do you use a Macintosh at

- ☐ 1. Business, government
- ☐ 2. Home for education or entertainment
- ☐ 3. Home for work at home
- ☐ 4. Home office
- ☐ 5. Educational institution
- ☐ 6. None above

Which of the following describes your occupation/department function?

- ☐ 1. Graphic arts: design, architecture
- ☐ 2. General office/administration, management, personnel, purchasing
- ☐ 3. Consulting
- ☐ 4. Education, training
- ☐ 5. Engineering/R&D
- ☐ 6. Sales, marketing, advertising, communications
- ☐ 7. MIS/DP
- ☐ 8. Programming/software development
- ☐ 9. Does not apply
- ☐ 10. Other (specify below)

What is the primary business of your company/institution?

- ☐ 1. Graphics
- ☐ 2. Aerospace
- ☐ 3. Business consultant
- ☐ 4. College/university
- ☐ 5. Elementary/high school
- ☐ 6. VAR/VAD/retail/wholesale (computer specific)
- ☐ 7. Engineering
- ☐ 8. Marketing, advertising, PR
- ☐ 9. Printing/publishing
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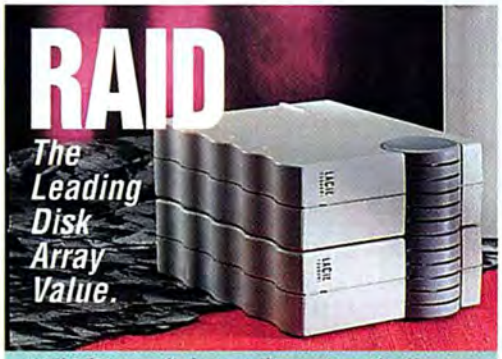
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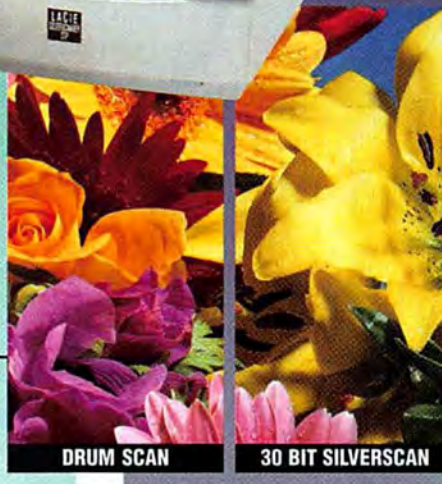
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850MB TrailBlazer	811MB	14ms	4500RPM	3 years	C109 1206/C109 1207	$219/279
1080MB Fireball	1042MB	12ms	5400RPM	3 years	C109 1202/C109 1203	$269/329
2200MB Capella	2103MB	8.5ms	5400RPM	5 years	C109 1213/C109 1212	$669/729
4300MB Grand Prix BEST BUY	4110MB	8.6ms	7200RPM	5 years	C109 1159/C109 1108	$999/1059
2100MB Atlas	2012MB	8ms	7200RPM	5 years	C109 1112/C109 1111	$799/859
4280MB Atlas	4064MB	8ms	7200RPM	5 years	C109 1122/C109 1121	$1229/1289
Seagate						
2.4GB Hawk 2 LP ST32430N	2295MB	9ms	5411RPM	5 years	C109 2211/C109 2112	$739/799
4.3GB Hawk 4 ST15230N	4105MB	9ms	5411RPM	5 years	C109 2212/C109 2113	$999/1059
2.5GB Barracuda 2 LP ST32550N	2043MB	8ms	7200RPM	5 years	C109 2203/C109 2109	$889/949
4.3GB Barracuda 4 ST15150N	4094MB	8ms	7200RPM	5 years	C109 2207/C109 2106	$1299/1359
5.25" Full Height						
9.1GB Elite 9 ST410800N	8669MB	11ms	5400RPM	5 years	S020 1014/C109 2110	$2199/2299
HEWLETT PACKARD						
2.0GB SureStore 2000LP	2046MB	8.5ms	5400RPM	5 years	C109 1210/C109 1211	$679/739
IBM						
1080MB Deskstar XP BEST BUY	1032MB	10.5ms	5400RPM	5 years	C109 1237/C109 1238	$269/329

ClubMac 2.5" Hard Drives

	Formatted Capacity	Access Time	Rotation Speed	Warranty	Part No. Internal/External	Price Internal/External
Quantum						
341MB Daytona SCSI BEST BUY	324MB	17ms	4500RPM	1 year	Q030 1041/C109 1119	$179/299
514MB Daytona SCSI	491MB	17ms	4500RPM	1 year	Q030 1002/C109 1109	$249/369
810MB Europa IDE	791MB	14ms	3800RPM	3 year	Q034 1025	$429 Internal
1080MB Europa IDE	1030MB	14ms	3800RPM	3 year	Q034 1028	$499 Internal

ClubMac Fast and Wide Drives

	Formatted Capacity	Access Time	Rotation Speed	Warranty	Part No. Internal/External	Price Internal/External
Seagate						
2.1GB Barracuda 2LP ST32550W	2047MB	8ms	5411RPM	5 years	C109 2214/C109 2215	$949/1049
4.3GB Barracuda 4 ST15150W	4094MB	8ms	7200RPM	5 years	C109 2206/C109 2208	$1379/1479
9.1GB Elite 9 ST410800W	8699MB	11ms	5400RPM	5 years	C109 2220/C109 2222	$2379/2499
Quantum						
2.2GB Capella VP32210SW	2103MB	8.5ms	5400RPM	5 years	C109 2219/C109 2217	$699/799
4.3GB Grand Prix XP34301SW	4110MB	8.6ms	7200RPM	5 years	C109 2216/C109 2218	$1029/1129

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C109 1223	3.5" ClubMac 105MB Removable*	$149
S198 2001	EZ135 135MB Removable *Cartridge not included	$234.95

SyQuest Media

Part Number	Media	Qty 1	Qty 10	Qty 20
S198 1010	44MB	$42ea	$41ea	$40ea
S198 1011	88MB	$47ea	$46ea	$45ea
S198 1012	200MB	$75ea	$73ea	$71ea
S198 1013	105MB	$35ea	$34.50ea	$34ea
S198 1014	270MB	$60ea	$59ea	$58ea
S198 2010	EZ135 Cartridge (135MB)			$19.99

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I040 1014	Jaz Drive w/one 1.0GB cartridge	$599.99
I040 1015	Jaz Cartridge (1.0GB)	$119.99
I040 1016	Jaz Cartridge (540MB)	$69.95
I044 1010	Zip Drive w/one 100MB cartridge	$199.99
I040 1006	Zip Cartridge (100MB)	$19.99
I040 1011	Zip Cartridge (3 pack)	$49.95

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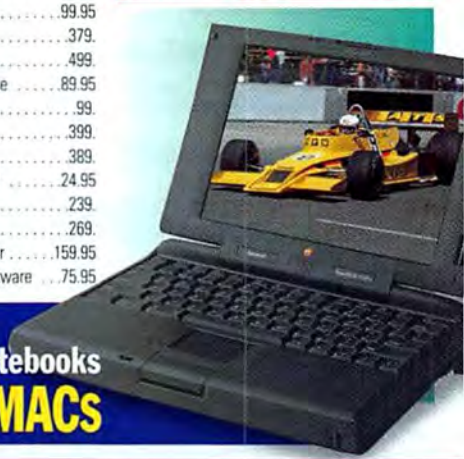
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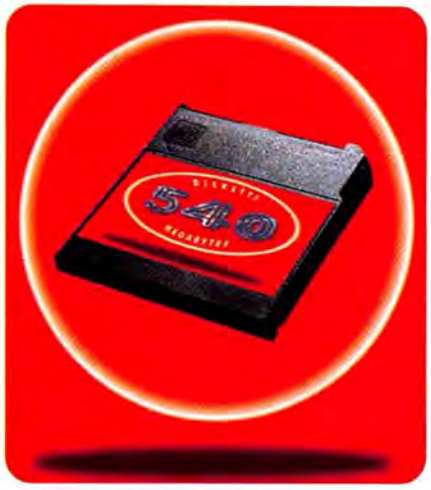
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Micropolis	4294MB	8ms	7200	512K	5yr	MC3243AV	$1049	$1109	
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Micropolis	9100MB	12ms	5400	512K	5yr	MC1991	$1985	$2085	
Micropolis	9100MB	12ms	5400	512K	5yr	MC1991AV	$2119	$2219	
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Micropolis	4294MB	8ms	7200	512K	5yr	MC3243W	$1059	$1159	
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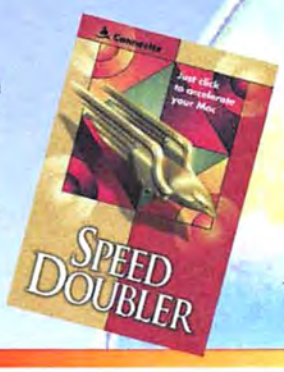
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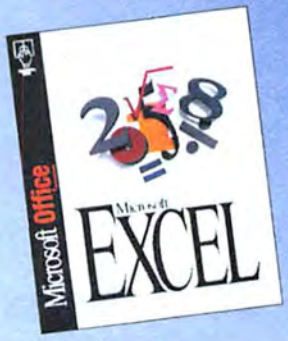
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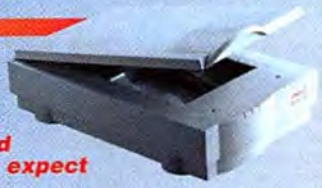
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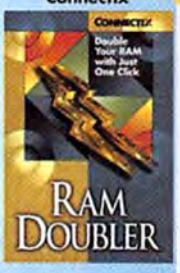
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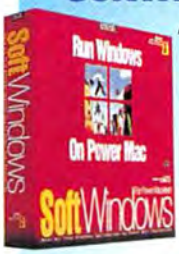
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APS ST 2.0[5] Seagate ST 32550N Barracuda	2047MB		849.95	949.95
APS MS 2.0AV[5] Micropolis 4221AV	1955MB		799.95	899.95
APS MS 4.0[5] Micropolis 3243	4064MB	LABS ★★★★	1099.95	1199.95
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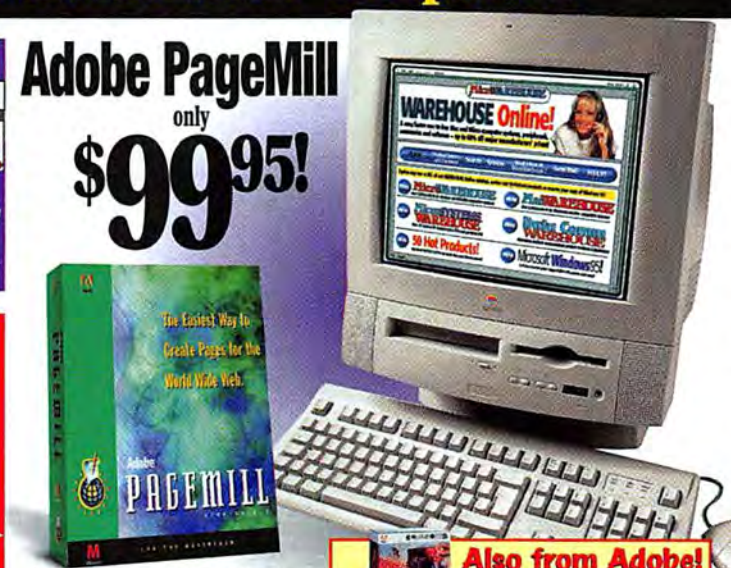
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0906	ThunderColor 30/1152 PCI	$1,629.00
0683	VideoVision Studio 2.0	$3,699.00

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1936	PaintBoard Prism Video Card	$298.98
0915	PaintBoard Prism GT w/Painter 3.0	$549.00
7956	Targa 2000 PCI	$4,799.00

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2168	PowerCard 66Mhz	$599.98
2164	Turbo 601 100Mhz for IIci	$1,198.00
2165	Turbo 601 100Mhz for IIsi	$1,198.00
2166	Turbo 601 100Mhz for IIvi, vx P600	$1,198.00
2169	Turbo 601/66Mhz	$837.98

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1361	Equalizer for PowerMac 6100/7100/8100	$69.98

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5802	MacCon-I LC TN	$104.98
5646	MC+30/ET64 IISI & SE/30 (TK/10T)	$145.98
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5817	Mini EN/SC for PowerBooks (10T)	$235.98
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5841	NetExtender Hub FN (AAUI/10T)	$129.98
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94105	TeleNet Connector DIN 8	$13.98

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01167	PowerPort/Platinum for PowerBook 1XX	$324.98
98183	PowerPort/Mercury for PowerBook DUO	$329.98
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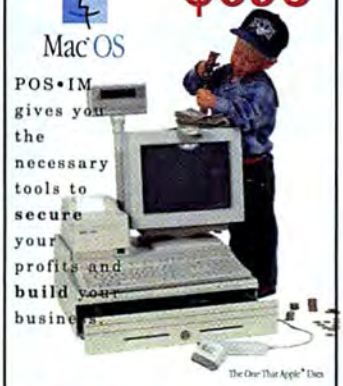
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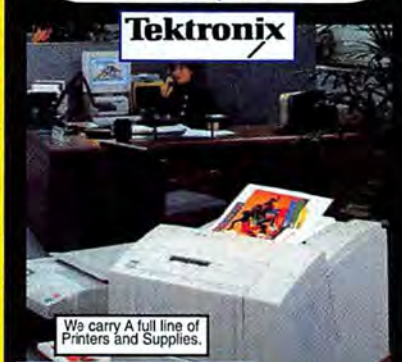
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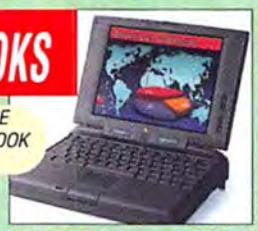
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520C 4/240	1695.
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Radius Pivot 15" Clr	595.
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Power Mac 7200[75] 8/500/CD	1,430	41
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8100/100 16/1G/CD $2739
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Quantum	**4.2GB GrandPrix 3.5"**	**899**
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HP	DeskJet 855C	495
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Apple LaserWriter Pro 810 NEW	$2699.
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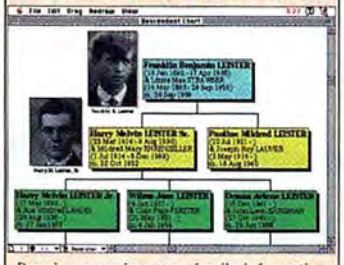
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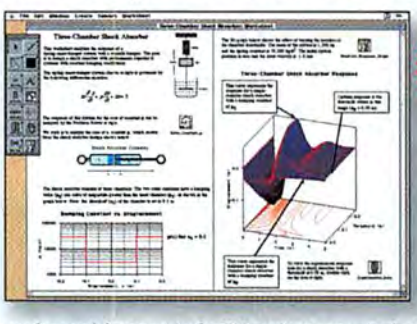
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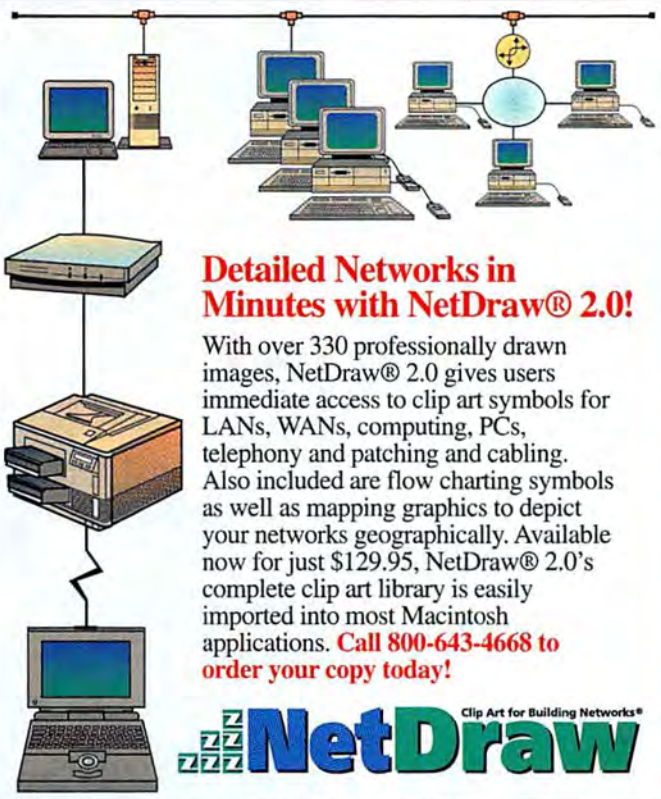
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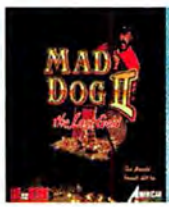
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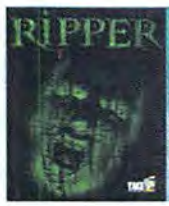
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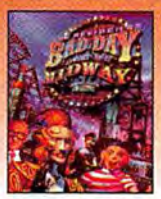
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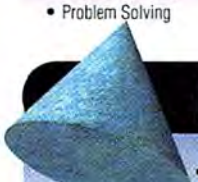
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by Larry Irving

Progress Report on the Information Superhighway

PRIVACY HIGH ON THE FED'S PRIORITY LIST—SURPRISED?

DURING THE LAST PRESidential campaign, we heard a great deal about the information superbighway, particularly from then–vice presidential candidate Al Gore. Since that time, other issues have dominated the news, while our national policy on the information infrastructure has developed in relative obscurity.

Now, this is a subject close to the heart of Macworld *readers, so we went straight to the source and asked Larry Irving, a top administration adviser on telecommunications, for an update. Here's what he told us.—Ed.*

An October 1995 Equifax/Louis Harris survey found that 80 percent of Americans fear they have lost control of personal data gathered by computerized information systems. We have already witnessed phenomenal growth in the use of information networks, but as long as consumers worry that their private information is vulnerable to violation or misuse, they will be reluctant to use the Internet for commercial purposes. This insecurity about privacy threatens to stunt the development of a National Information Infrastructure (NII), but unless and until these legitimate concerns are addressed, users are right to be cautious.

Am I Being Watched?

Few people realize that when they surf the Internet, they leave "mouse droppings"—a trail of every site they visit and for how long. Without having been authorized to do so by their subscribers, online services can collect data that identifies a person's entertainment and shopping habits, religious persuasion, political affiliation, and so on. And some service providers do, selling data derived from mouse droppings to enterprises wanting to market their products directly to you.

Existing privacy regulations often fall short of consumer expectations. Moreover, privacy protection is not uniform across the communications sector. For example, different standards apply if you order a movie from a cable company and if you order it from a direct-broadcast satellite or other wireless service. And personal information generated in the course of using the Internet is currently afforded little or no privacy protection.

A System of Voluntary Controls

Last October, in response to consumers' growing concerns over Internet privacy, the National Telecommunications and Information Administration (NTIA) released "Privacy and the NII: Safeguarding Telecommunications-Related Personal Information." This white paper proposes a framework for developing minimum



privacy standards that communications and information service providers, such as phone companies and video and online services, would use to protect any personal information their subscribers generate.

Informed consent is the keystone of this framework, and the plan's success depends on service providers' willingness to be self-regulating. Before selling information that a consumer has divulged to gain access to the network—telephone number, home address, credit card information, and service preferences—or using that data for any non–service-related purpose, a service provider should have to disclose how it plans to use the information and obtain that consumer's consent. Explicit customer consent should be required before sensitive information, such as financial history, political affiliation, medical records, or sexual orientation, could be used or disclosed. The absence of any request to withhold less sensitive information would be sufficient to authorize its use or disclosure.

Consumer education is another key component of the NTIA's privacy framework. Educated consumers would understand how to safeguard the use of their personal information, including how to selectively make it available in order to receive discounts or purchase desired products and services—a benefit to consumers and businesses.

Consistently applied across the communications sector, a common standard based on notice and consent would prevent companies from gaining an unfair competitive advantage. A common standard could also ensure no disruption of information in international markets where new privacy protections are being implemented.

Securing the NII's Commercial Base

To maintain a dynamic marketplace in cyberspace, the Clinton administration is committed to ensuring the adoption of sufficient safeguards to protect the privacy of American consumers through industry self-regulation or, if necessary, government intervention.

For information on NII initiatives, including those on universal service, intellectual property, security, and applications, visit the NTIA's Web site at *http://www.ntia.doc.gov*. m

LARRY IRVING, assistant secretary for communications and information, is the administrator of the National Telecommunications and Information Administration, which advises the president, vice president, and secretary of commerce on telecommunications issues.

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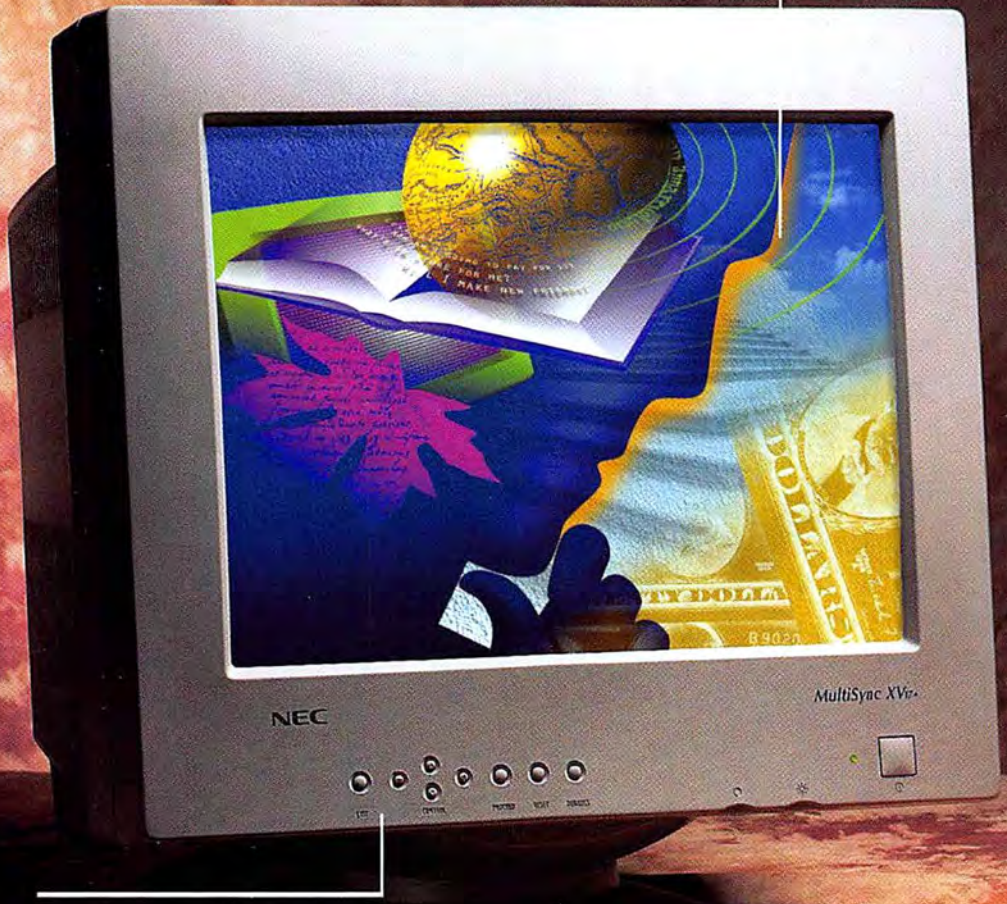
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